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The Design of Symbols for the Electronic Mail in the World Wide Web

Master of Design thesis
in Visual Communication Design

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Introduction

Theoretical framework: communication, technology and design

The Industrial Age provided mankind with inventions that narrowed the distances that separated people from around the world. The telegraph, telephone, radio, television, fax machine, cellular phone, and the Internet, they all have a very important feature in common, they all enhance communication through technology. Our post-industrial age has inherited these technologies and applied them around one pivotal point: Information.

Communicating information is one of the vital activities of daily life in this Post-Modern era. We treasure the information we receive because it influences the decisions that we take for the short and long run of our lives. Our days start getting the latest news: what happened in the world while we were sleeping? There is no escape from information, even if we do not watch television, or listen to the radio, or read the newspapers, or connect to the Internet; the oldest and most effective vehicle of communication, the word of mouth, will bring it to us.

The evolution of mankind has always been marked by two particular factors: communication and technology. The evolution of these factors is deeply intertwined as communication spreads knowledge and knowledge breeds technology and technology improves communication. It is a constant circle around which civilizations evolve.

Technology has divided human history in different ages: Stone Age, Copper Age, Bronze Age, Iron Age... Industrial Age and Information Age. These epochs are named on the core element around which human life revolves and technology is developed along those years. Communication has allowed the enrichment and development of human knowledge beyond time and space, transmitting it from one civilization to another through different vehicles and preserving it along the years and centuries by different mediums.

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Nowadays, technology has brought communication to a stage in which we can describe the way we exchange information with 3 words: broader, faster, and almost anywhere. Communication has become extensive, fast, and ubiquitous, and so the way we live our lives. The evolution of communication technology seems to be aiming for one goal: bring all distant places together, at once, and in the fastest way possible. It seems that we are turning Earth into a living brain in which we will all play a synaptic role.

But how will we communicate effectively at this global level, when different languages and cultural backgrounds that mould our perception of things create barriers among people trying to understand each other?

Having circa 6,700 languages used all over the planet (source: www.sil.org/ethnologue) it seems almost impossible to agree about one common phonetical code for mutual communication. It is true that in the last decades English has become a major important language, being utilized primarily for international commerce and world politics, and lately in the Web. But spoken-written language has proven to fail in becoming a worldwide accepted instrument of communication; in words of Dreyfuss (1972):

Hundreds of attempts have in fact been made in the last two centuries to develop an official second language that in time could be adopted by all major countries. Esperanto, Interlingua, Ido, Volapuk –all combining elements of existing languages- and Ro and Suma, both created artificially, are but six such attempts. Among other drawbacks, they all rely, as does basic English, on the Roman alphabet. This restricts their usefulness to those countries which utilize the Roman alphabet, and these are actually a minority among nations. (p. 18)

On the other hand, symbols have been used along human history as a dependable way of communicating information through time and distance.

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Quoting Dreyfuss again:

Symbols have already evolved to the point of universal acceptance in such areas as music, mathematics, and many branches of sciences. A Beethoven symphony sounds the same in Japanese as it does in the original German; a column of digits adds up identically in Polish and Spanish; and a Russian scientist easily deciphers equations discussed in an English scientific journal. (Idem)

The oldest remains of human depictions that communicate a meaning can be tracked to circa 15,000 – 10,000 B.C. Examples of these are the famous paintings in the Lascaux caves of southern France. Quoting Meggs (1998) about these paintings:

This was not the beginning of fine art as we know it. Rather, it was the drawing of visual communications, because these early pictures were made for survival and were created for utilitarian and ritualistic purposes. (p. 5)

The oldest human civilizations, like Sumerians, Babylonians, Egyptians, Mayans, and Incas developed their cultures exchanging information through pictographs, ideographs, and other forms of communication systems based on symbolic codes. The Egyptians were the first to combine words and pictures that together communicated information. Illustrated manuscripts they left to posterity, such as *The Book of the Dead*, are just one proof of how important and extended was the use of these symbol-based codes.

Egyptian hieroglyphs were difficult to understand for modern cultures through centuries until 1799, when Napoleon's troops unearthed a huge polished rock containing inscriptions encoded in Egyptian hieroglyphs, Egyptian demotic script, and Greek. This slab is known nowadays as the Rosetta Stone, and it was the key that helped to decipher the ancient hieroglyphic picture-writing

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system. This petrified record-keeper came to be a dictionary from symbolic to written language, a door to an ancient way of encoding information that preserved it for the centuries to come.

Languages evolved from the need to communicate. In highly developed stages they use many rules in phonology, prosody, syntax, grammar and other disciplines, which are necessary to accurately describe complex meanings. But written and spoken language come to be too intertwined and time-consuming to transmit simple meanings, especially in our Internet days.

The field of Public Information Symbols developed from the human need to communicate accurately simple meanings across language and cultural barriers. In words of Foster (1994):

Using graphic symbols rather than words to communicate messages to the public has a number of benefits: the major one is that symbols transcend language, and can communicate to people who have no knowledge of each other's language... The aim of standardizing public information symbols is to create such an agreed set [of symbols]. (p. 161)

One of the pioneers in creating a modern "world language without words" was Otto Neurath, who developed ISOTYPE. This word stands for International System of Typographic Picture Education. As a sociologist and educator, Neurath believed that pictures were better means of communication than words.

To translate complex figures into a form that would be both accurate and meaningful to a broad audience [Neurath] devised not only a series of refined pictographs, but also the techniques for their design and application. The graphic point of departure for all his pictures was always what the observer actually saw, rather

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than the spoken or written word associated with the object or person. The picture had to be so refined in its execution that it immediately presented the most important fact or characteristic first, less important ones second, and details last. (Dreyfuss, p. 24)

Neurath devoted most of his professional life to create a refined method to depict information through symbols. With his skills and knowledge, he formalized the use of pictorial language.

Otto Neurath firmly believed that the world needed a uniform, international visual system of expression that would work as an auxiliary language in complete accord with each of the world's spoken languages. (Dreyfuss, p. 25)

Symbols should not be viewed as a language that is added to all the ones existing all around the world. Symbols should be viewed as a Rosetta Stone that brings along different languages into a common understanding. As Dreyfuss described it: a supplement to all languages to help create a better and faster understanding.

As the world grows steadily smaller, the need for easy communication becomes increasingly acute, and man has apparently come full circle – from prehistoric symbols, to sophisticated verbal communication, and now back to symbols, to help us all live together in today's Tower of Babel. (Dreyfuss, p. 19)

We live in a reality in which boundaries are starting to disappear. The new communication technologies, such as the Internet, are turning antipodes into neighbors and bringing together dissimilar cultures. A need for a common understanding should be foreseen as a priority and actions should be taken to overcome the difficulties this may arise.

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We make a call to all communication designers, as problem seekers-and-solvers, to analyze the circumstances of our Post-modern world: the Information Age. Improving international communication will be a major task for our field in the near future and this future seems to move in 'Webtime'. We take our responsibility, and make a first step through this project.

Practical framework: material, experiment and results

Since the public-open availability of the World Wide Web in 1992, the popularity of this communication arena has increased exponentially. Being a global network that users can access from any place around the world the Web comes to be the first interactive, off-boundaries, and censor-free international communication tool.

Chaos seems to be the inherent nature of the Web, every website is usually an individual and independent space with its own rules and aesthetics. Because of this lack of consistency users have to learn constantly how to navigate from one place to another, using what they learned in one Website and hoping the next one works the same way: a dynamic knowledge-transfer.

A new visual language is growing in this every-day mutating network, with no regrets on facilitating the users with 'navigation' cues that allow them to migrate easily from one site to another. Few standards have been defined and the ones that exist are mainly by a convention brought by common use. For the rest, there is a narrow interest in creating standardized user-friendly displays. This new media requires established visual directives that can cue the users through a trouble-free 'navigation' experience.

A good example of this situation is the Electronic Mail service offered by different providers on the Web (subsequently referred to as 'Webmail'). The increasing popularity of this service has brought a vast proliferation of providers like Hotmail, Mailcity and Netaddress. Even though some of these provid-

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ers have defined certain conventions in their display, they do not show any defined standards related to their interfaces, which results in a lack of consistency throughout their different sites.

These services are mainly structured with a set of hyperlinked words (key-words) that act like a text-based interface that allows the users to operate their accounts, but there is no defined convention on the keywords used, so they vary from one provider to the next one. As an example, to exit your Webmail account in Hotmail you have to click on 'logout', in ICQmail on 'logoff', and in Yahoo mail on 'signout'. This is confusing not only in the lack of consistency, but in the lack of the transparency of these terms' meanings.

There is another and very important fact we have to take in account for these conventions. The majority of Webmail providers are in the U.S.A. and they use English in their service, these keywords might be easy to guess for a native English speaker but, being the Web a broad open source for so many cultures and languages (and Webmail a native of this environment), what happens when the users are not proficient in this language? Multilanguage services can be one solution to this problem, but this does not solve the problem for the user, this solves the problem for the provider. To illustrate this point, let us refer to the the following situation:

Imagine you are in an foreign and unknown airport, just arriving from a delayed flight. You have a narrow half an hour to get your luggage, go through customs and rush to a meeting happening somewhere in downtown. You don't know the language very well and even though you are carrying a pocket dictionary, looking for the words in it is time consuming; what do you do? You read the signs to find your way to baggage claims, customs and the taxi parking lot or the railway station, using the symbols in the signs as wayfinding visual aids. Certainly these signs will have a list of meanings in different languages but how much time would you have spent looking for the

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one you could understand? And what if the translation of the meaning had been confusing or poorly done? It might have solved the problem of the airport (as a service provider for international users) but, would it have solved *your* problem? On time? Symbols are visual cues that help people sort situations like this successfully.

What we pursue with this comparison is that an interface that defines standard symbols as navigation tools, rather than variable words, is meant to be more successful for a service provider with an international audience. When your audience is in the World Wide Web, you definitely have to think with a global perspective.

But going back to our explanation of actual Webmail providers using text-based interfaces, the technical reasons to design in this low-end medium must be stated: the fact that it is time-consuming to display images fast enough using slow modem connections, turns these keywords into the best navigation tools for these services. Nevertheless, the increased development of technology that allows us to navigate the Web nowadays with 500Mhz processors and T1 connections (when this paper was written) facilitates the development of Graphic User Interfaces (GUIs) for Webmail, breaking language barriers and improving the performance of these services that are becoming a main tool for world-wide instant communication.

The purpose of this project is to design symbols that can become the standard navigation interface elements of Webmail. Due to the vast and broad range of users of this service, a single unit of symbols is not enough to be defined as a standard, as the users come from many different cultural backgrounds. Nevertheless a study of possible solutions in this field must be done, foreseeing the need of a common understanding by people from all over the world.

Objectives and Project development

1. Objectives of the project

Primary objectives:

- 1.1. Design a set of symbols that represent the main interface commands used in Webmail
- 1.2. Test this set of symbols against a representative population sample
- 1.3. Obtain results regarding the comprehensibility of these symbols

Secondary objectives:

- 1.4. Obtain results regarding preferred aesthetical styles for symbols in Webmail
- 1.5. Obtain information regarding the use of symbols or keywords as interface elements
- 1.6. Obtain information regarding the use of Webmail as an international communication tool

2. Project development

In order to pursue these objectives the project was divided in several stages:

- 2.1. Concept Definition
- 2.2. Audience Definition
- 2.3. Design Parameters
- 2.4. Design Process
- 2.5. Evaluation Method
- 2.6. Evaluation Parameters
- 2.7. Experiment Application
- 2.8. Results

These stages will be described in the following sections, structuring a narrative that will provide the reader with a clear and detailed overview of how the project was carried out.

2.1. Concept Definition

The first stage was to define the concepts to be represented. For this conceptual definition a field research was done: nine different Webmail accounts were opened to analyze their interfaces and to define specific commands that would be depicted by the symbols. The Webmail providers selected were:

- * *Canada* (<http://www.canada.com/members/personalize/email>)
- * *Excite* (<http://www.mail.excite.com>)
- * *Hotmail* (<http://www.hotmail.com>)
- * *ICQmail* (<http://www.icqmail.com>)
- * *Loquesea* (<http://www.loquesea.com/mail>)
- * *Netscape* (<http://webmail.netscape.com>)
- * *Starmedia* (<http://www.starmedia.com/email/login>)
- * *UsaNet* (<http://www.netaddress.com>)
- * *Yahoo!* (<http://www.mail.yahoo.com>)

These providers were picked from a broader list that was categorized ranging from very popular and established ones like Hotmail, to newer and less-known ones like Starmedia. The final selection was done picking representative providers that could address the broadest gamut of users.

Once the providers were selected, Webmail accounts were opened and each interface was analyzed individually, specifying their most important features. The results of this individual analysis were compared. The following ten key concepts, that all the interfaces had in common, were defined. These concepts are:

- * **Connect to Account** (found as: Log in/Sign in/ Sign up)
- * **Get new Email** (found as: Check mail/Get mail/New mail/Read mail)
- * **Write new Email** (found as: Compose/Write mail)
- * **Reply Email** (found as: Reply)
- * **Forward Email** (found as: Forward)
- * **Save Email** (found as: Move to/Save)
- * **Delete Email** (found as: Delete/Move to trash)
- * **Organize Folders** (found as: Folders/Manage folders)
- * **Open Address Book** (found as: Addresses/Address book/Contacts)
- * **Disconnect from Account** (found as: Exit/Log off/Log out/Sign out)

Project development

It was considered important to look for existing symbols or icons that related to these concepts, therefore Email-manager programs were also targeted for the field research. Email-manager programs are system-resident software used to access local computer terminals (local servers) in which users have Email accounts.

Many institutions use Email-managers for their personnel to access their accounts from local computers. This programs usually operate with Graphical User Interfaces (GUIs) instead of text-based interfaces, as much computer software does nowadays.

Existing icons were revised from three of these popular programs: Eudora, Outlook and Pegasus. Conclusions obtained from the visual analysis of these programs' GUIs were:

- * The display of the icons is set in a 'taskbar' at the top of the screen
- * The icons that represent the tasks are visual metaphors of objects used in an office
- * The icons use similar elements to depict similar metaphors (i.e. envelope for mail)
- * In the three programs, the tasks represented are similar, but depicted differently in each
- * Tasks that refer to actions are represented with motion and direction icons (i.e. arrows)

It was also observed that the main tasks depicted in these programs were similar to the ones in Webmail. This fact was definitive to start the physical design process of the symbols, once the concepts (the meanings of what to represent in them) were finally settled.

Being elements that structure the interface, it was important to understand the relationships between the concepts and the symbols. This was necessary in order to achieve the best depiction for them. Once defined the concepts, we analyzed them looking for patterns that could structure relationships. Three levels were defined in which we grouped the 10 concepts.

Project development

1st Level: Operation

Concepts that relate to the basic functions that are necessary to operate the account

- * Connect to Account
- * Disconnect from Account
- * Get new Email
- * Write new Email

2nd Level: Response

Concepts that relate to functions that act as a reaction to received information

- * Reply Email
- * Forward Email
- * Save Email
- * Delete Email

3rd Level: Classification

Concepts that relate to functions that archive and structure received information

- * Organize Folders
- * Open Address Book

Now it is possible to define and categorize the concepts for the symbols, but before we can structure any general design parameters or evaluation process, we have to determine a very important factor: who is the target audience?

2.2. Audience Definition

Webmail is a world-wide used application, used by people from different countries around the world. We had to narrow somehow our specific audience from this broad list of prospects. From this statement it was analyzed that, being this a project aiming for international users to test symbols designed for a Web-native application, our target audience certainly should be able to use the Web.

From this analysis we defined our target audience simply as 'the Web user'. They could be active Email users or not, but the fact that our evaluators should be people who accessed and utilized the World Wide Web, was indeed essential.

This audience, still a large group, had an important feature to consider: different cultural backgrounds. This audience could not be defined by a particular parameter like education level, income level, age, or gender. Not even by the same language spoken. This had to be considered for both the design process and the evaluation method. The approaches taken to solve this challenge will be reviewed in further sections.

A very important factor still had to be defined: the sample group. This refers to a smaller group of people from this audience, which would test the Webmail symbols: the sample group has to be a valid representation of the wider population of Webmail users.

A good source of information was found in work by Salant and Williams (1994) about sample group definition. According to these authors it was possible to obtain results from wide populations by doing research on small sample groups, having a confidence level of 95%.

Project development

Considering these conditions for sample-size, it was found that we were aiming for a total estimated population of 100,000,000 users (Salant and Williams, 1994). According to their conversion tables we needed a sample group of 96 people to obtain results with a $\pm 10\%$ of sampling error, in the 95% confidence level.

Once we defined these facts for our audience definition, the next step was to establish the parameters we would use to design the symbols.

2.3. Design Parameters

Considering the objectives pursued in this project and the concepts we defined for the symbols' meanings, the design parameters stated were:

1. Symbols should depict as clearly as possible the concepts defined
2. Symbols should be organized in a practical and logical GUI
3. Symbols should correspond to the technology they are developed for
4. Symbols should address an international audience
5. Symbols should support the cognitive processes of the user

The first parameter meant that the design of the symbols should reach high levels of *comprehensibility* for the user, *integrity* among the symbols, and *correspondence* with the concepts defined.

The second parameter meant that the design of the symbols should keep in mind the whole environment in which the symbols will be used when reaching the user: the Graphical User Interface that operates Webmail. Symbols are designed individually but are part of a whole.

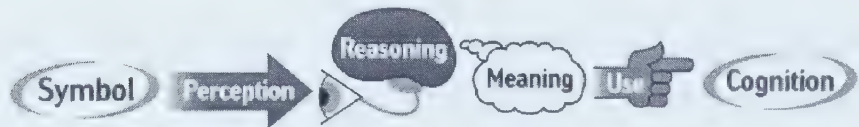
The third parameter meant that the design of the symbols should refer to their final delivery media: the computer screen. Electronic media's advantages and restrictions are considered when developing the symbols.

Project development

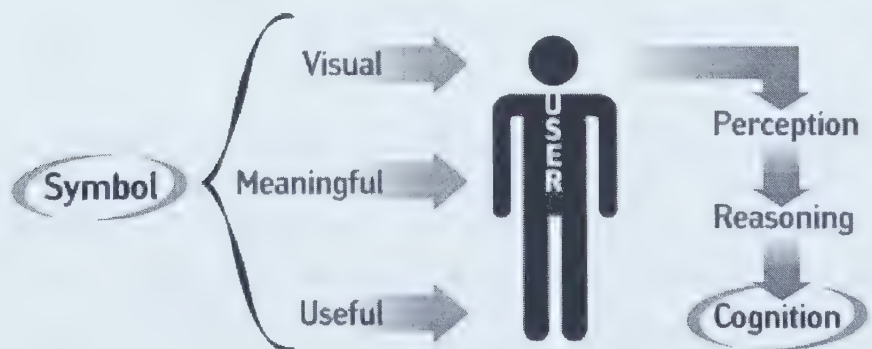
The fourth parameter meant that the design of the symbols should keep in mind that their final audience were users from around the globe, with different cultural backgrounds and different visual preferences. Principles for the design of International Public Information Symbols should be considered for the development of the symbols.

The fifth parameter meant that the design of the symbols must enhance the learning process: A process in which the user learns to understand each symbol as the depiction of a particular meaning.

The cognitive process that we refer to, can be depicted as follows:



The Symbol designed for this project should follow that process as we depict it here:



In this process it is understood that a constant exposure to the symbols (repetition) should happen for the user to accept and finally learn the symbols. Therefore, the creation of symbols capable to succeed in the cognitive process in a short period of time, and with the least confusion possible, became a critical factor that we should embed in the design process.

2.4. Design Process

The next step to follow was to define the general design process, but before going hands-on with the design of each symbol we had to analyze and define the key elements of the whole Webmail system and afterwards, we could proceed with the design of the symbols.

It was found that the message was the most important unit in this system. Every function in Webmail referred to the message in one way or another: access to the message, write and receive a message, reply or forward messages, delete or save a message; therefore it was used as the pivotal point for the design process.

We could fulfill one of our secondary objectives through this step: to find preferred aesthetics from the symbols. In order to pursue this, we decided to profit from the three functional categories in which we grouped the symbols (Operation/Response/Classification) making a visual emphasis in the differences among the symbols, according to the functional level they belonged to.

Nevertheless, considerations had to be made, as one of our parameters was to design symbols that could be organized in a logical GUI. Therefore the differences we wanted to have in the depiction of the symbols had to be as subtle as possible: a merging point in which a visual integrity along the whole set was respected, and the visual differences of the tree groups could still be perceived.

Project development

In order to harmonize these two divergent influences (visual differences between the symbols vs. visual integrity among the symbols) in the design process, we defined several statements to follow when going hands-on with the design of the symbols:

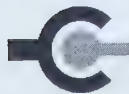
- * Existing symbols will be considered for reference
- * Analogy will be used as a conceptual approach
- * Different analogies will apply to each level
- * The depictions should be done using a simplistic representational approach
- * A constant depiction of the message along the whole set will keep its visual integrity

a) Operation

For the first level, a minimal difference was found among their four elements: two of them related to the access of the account (Connect/Disconnect) and the other two related to the immediate use of the account (Get / Write). Based on this distinction two different analogies were used, for this level only.

For the first two concepts we referred to existing symbols, in architecture and engineering sources, of household lines: electric power, telephone and cable. 'Connection' was defined as the most important concept to depict in this category. Therefore, we aimed for a proper graphic analogy. The symbols designed were:

CONNECT TO ACCOUNT



DISCONNECT FROM ACCOUNT



Project development

These depictions represented two elements: the server and the user. The server was represented by the element on the left, a black C-like shape. The black color conveyed a passive and fixed structure. The circular shape represented a whole entity and its empty inner space indicated the place in which the connection would occur.

The user was represented by the element on the right, an orange dot. The orange color conveyed an active and dynamic entity. Its size matched the empty inner space of the other element to convey its capability to connect the server. Both elements had a 'tail' element that represented their independent origins.

For the latter two concepts we referred to existing symbols, in both courier and electronic mail sources. Having established that 'message' was the central unit of this system a symbol for this concept was created first. The two symbols were designed around this depiction for 'message': the letter was our analogy for 'message', and from the depiction of opening and writing a letter the symbols designed were:

GET NEW EMAIL



WRITE EMAIL



These depictions represented two elements: the message and the action occurring. The message was depicted as a piece of paper with lines that represented the text written on it. The light blue color of the message conveyed a passive element with a central role. It also gave a good contrast against the orange color that the depictions of the actions had.

Project development

In the first symbol the analogy was an open envelope containing the message, in the second one a pencil writing the message. The orange color represented the dynamic element in the symbol and conveyed the action occurring to the message. It also contrasted with the light blue color that the depiction of the message had.

Orange was selected as the color for this first set because of its warm and dynamic hue that implied action and, as well, could be related to the real-life objects: envelope and pencil.

b) Response

The concepts of the second level, were actions that referred to the message itself. Therefore we used the established message symbol and defined a system that depicted the actions occurring to it.

We referred to symbols used in Email manager software and found that it employed directional arrows to depict the actions. Using these as a starting point, different ways to depict actions were examined, through dynamic elements like these. For our analogy, a popular and established set of symbols was analyzed, namely the display of the control panels for audio and video players. This interface also referred to actions occurring to information, stored in tapes and discs.



We considered that having this interface as a frame of reference, the correlation to the actions for Webmail could become intuitive. The symbols designed were:

Project development

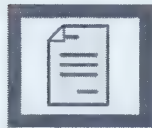
REPLY EMAIL



FORWARD EMAIL



SAVE EMAIL



DELETE EMAIL



It was expected that the symbols for 'Reply Email' and 'Forward Email' could be related to the player's interface symbols 'Rewind' (go back) and 'Forward' (go forward). The depiction of 'Save Email' intended to recall the 'Stop' (do not go) referral instead of the 'Record' one; it was approached as a depiction of stillness that could contrast against the other two, more dynamic symbols.

For the depiction of 'Delete Email' we referred to standard representations for prohibition used in the Public Information Symbols field. It turned out that two representations were used: a thick line crossing in front of the symbol from the upper left corner to the lower right corner, and a cross placed in front of the symbol.

We selected red as the color for the four symbols, as we had to restrict this last symbol with this color's referent to prohibition, and as we found no interference with the concepts of the other three symbols. It also created good contrast against the message's light blue symbol, and being a warm and dynamic hue it could be related to the actions occurring.

Project development

c) Classification

For the third level it was found that existing symbols for these concepts in the Graphical User Interface field were iconic depictions of objects from real life, folders and booklets used to archive and organize information. These were the best analogies to apply as they were already being used for many software programs. The symbols designed were:

ORGANIZE FOLDERS

OPEN ADDRESS BOOK



For the concept 'Organize Folders' the depiction of a folder conveyed the idea of organizing information. The color used for this symbol, in most of the GUIs found, was yellow and there was no specific reason to change it. For the concept 'Open Address Book' the depiction of a real address book was expected to be the best analogy. The green color was considered as a harmonic hue that matched this symbol with its level companion, and helped the user to differentiate their similar shapes.

2.5. Evaluation Method

Once we established the concepts, designed the symbols, and defined the target audience, the next step was structuring a method that could make users reach the symbols for testing.

We wanted to add an interactive value to the project, a particular quality of the Web that this experiment could offer to the evaluators. We also wanted

Project development

to get the most dependable information from this particular audience. We considered that instead of being us who selected the people that would test the symbols the users should participate through a volunteer recruitment.

In order to achieve this and to reach the broadest range of international users, we decided to set up the test of the symbols as an online survey: a questionnaire posted on the Web that any user around the world, with access to the Internet, could reach and answer.

To design the proper questionnaire for this media field research was carried out. First, several institutions that could relate to our project, like the International Organization for Standardization (ISO), the International Electrotechnical Commission (IEC), and the Canadian General Standards Board (CGSB), were approached and it was found that no previous work in this particular field had been made. Nevertheless work had been done for symbolic road signs, public information symbols, interface design, and icon symbols for computer software. These organizations provided a substantial bibliography and very valuable references in these fields, which could be used as a frame of reference for this study.

As well, professional references in the field were approached. Colleagues in the Department of Art and Design, at the University of Alberta, had recently concluded research in Web navigation using a Web survey as a primary information source. This became a developing platform for the study here reported. As well, colleagues at the Text Department of the KUB University (The Netherlands) provided us with substantial material in questionnaire preparation, valuable information that would allow developing a meaningful and trustworthy content for the survey.

The last source approached was the Web itself. A search for information in online survey design and application, lead to two useful sources: Survey Site

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(www.surveysite.com) and NPD Online Research (www.npdor.com). From the content of this Websites, the appropriate format was developed. That format will make our survey fit in the selected media.

In order to build an accurate electronic research document, we settled a list of final parameters that shaped both the final structure and format for this online survey.

The parameters defined for the structure of the questionnaire were:

- * Restrict the number of questions to a total average response time of 10 minutes
- * Include at least one 'Welcome' and one 'Thank you' paragraphs as courtesy
- * Address the questions as first-person for a more participatory approach
- * Give simple and clear instructions on how to answer the Survey
- * Give a general and brief description of the purpose of the Survey
- * Divide the Questionnaire in four sections to address a fluent structure:
 - A. - Personal Information
 - B. - General Approach towards Webmail
 - C. - Testing Webmail Symbols
 - D. - Extended Participation

The parameters defined for the electronic format of the online survey were:

- * Available 24 hours a day
- * Prepare the content in a single scroll page
- * Make a simple design using plain colors and text
- * Symbols will be the only images displayed
- * Include a 'pop-up' window to notify successful completion
- * Make the code cross-browser and cross-platform proof, as possible

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These parameters defined the physical and technical structure of the survey. But the most difficult task was to define the evaluation parameters we should apply to test our symbols.

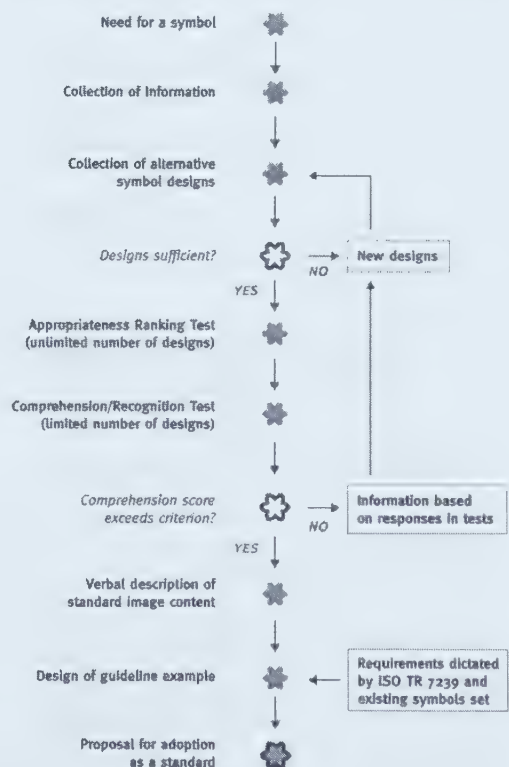
To define these parameters, work by Easterby and Zwaga (1976, 1984), and by Easterby and Graydon (1981) for the ISO in the Public Information Symbols field was analysed. As well, work done by Brugger (1990) and by Foster (1990, 1994) in the evaluation of the ISO development procedure for Public Information Symbols was examined.

From these sources it was found that the parameters of evaluation used for the ISO research were an effective procedure that could be applied to the testing of the symbols.

Nevertheless inherent differences between symbols for Webmail and the symbols for Public Information should be taken into account for the selection of the evaluation methods.

Brugger (1990) accurately described the ISO procedures on the evaluation and testing of public information symbols through the following diagram.

PROCEDURE FOR THE DEVELOPMENT OF PUBLIC INFORMATION SYMBOLS



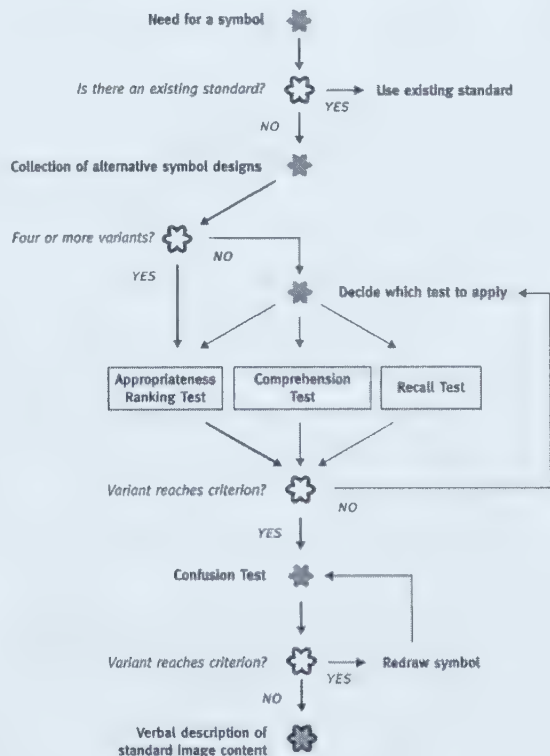
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These procedures were part of the guidelines that the Working Group 1 of ISO/TC 145/SC 1 defined in 1986, based in previous work done by Easterby & Zwaga (1976) and Easterby & Graydon (1981). But according to Foster (1990), it took ISO 15 years to standardize only 50 symbols using these procedures. He proposed a revision of this.

Such a lengthy process is simply not acceptable: designers and manufacturers will (and do) ignore standardisation. There is an urgent need to simplify the testing programme. (p. 163)

Foster's revised procedure for the development of Public Information Symbols was illustrated through the following concise diagram.

REVISED PROCEDURE FOR THE DEVELOPMENT OF PUBLIC INFORMATION SYMBOLS



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Foster's arguments proved to be valid. His revisions made a subtle but significant difference in the structure of the ISO procedures which improved their performance for Public Information Symbols. But most important, they allowed their application to fields beyond.

We then used these revised procedures to structure the content parameters for our Webmail symbols testing. We foresaw that the application of these procedures would give the symbols a significant value as candidates for standardization. Nevertheless the whole process should have to be applied for validation. Having not enough time and resources, we decided to go through the process up to the Comprehension test. The results obtained could be revised to improve these Webmail symbols and re-design and re-test them through the whole process for a future proposal for standardization.

2.6. Evaluation Parameters

Based on Foster's research (1994) it was found that symbols could be evaluated in terms of a number of distinct attributes:

- * Detectability (is the symbol findable when intentionally seeking it?)
- * Conspicuity (is the symbol visible when *not* intentionally seeking it?)
- * Discriminability (is the symbol discernible in an array of several symbols?)
- * Visibility (is the symbol identifiable under degraded conditions?)
- * Comprehensibility (is the symbol's meaning identifiable under clear conditions?)
- * Behavioural Effect (does the user react to the symbol's meaning?)

We decided to make an individual evaluation of each of these attributes to define which ones applied to the circumstances in which we needed to test our Webmail symbols.

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a) Detectability

Foster (1994) described detectability, through a psychophysical definition, as how weak a stimulus could be or how rapidly could it be shown, and still be detected. The way in which detectability is measured can be described as follows:

Respondents are presented with a series of trials, some of which contain a signal while others (the noise trials) do not. The respondents have to judge on each trial whether or not a signal was presented. (p. 186)

We considered that, because this method aimed for the detection of the symbol under a short period of exposure time, and measure if the respondent was able to identify its presence, it was not an attribute that we should use in this experiment. Our symbols would always be present in the users' screens, in their close field of view. Therefore, detectability was not selected as one of our evaluation parameters.

b) Conspicuity

Foster (1994) recalled the definition stated by Boersema, Zwaga and Adams (1989) for this attribute, 'the probability that the object will be noticed by an observer within a fixed time or, conversely, in terms of the time required to locate the object.' He also stated the similarity of this attribute with detectability, concerned about whether or not the stimulus was detected by the respondent.

In normal, everyday situations the respondent is processing numerous inputs, and a symbol

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has to compete for attention. It is the attention-gaining power which is referred to as conspicuity. (p. 186)

Having similarities with detectability, in the search of stimulus for the detection of the symbol within a period of time, and because of the constant presence of our symbols inside the user's field of view, conspicuity was not selected as an evaluation parameter for the evaluation of the symbols.

c) Discriminability

This attribute could be defined in a simple sentence: if a symbol could be identified from others when displayed all together the same visual array. Foster (1994) describes the application of this attribute as follows.

[It] involves presenting an array of symbols and asking respondents to locate a target, so that they have a visual search task which does not require them to interpret the meaning of the target. (p. 187)

In this attribute time was an asset. Discriminability was measured according to the time taken by the respondent to locate the correct symbol. This attribute could be used if we delivered the survey on a more controlled environment, in which we could measure the time taken by the users to locate a symbol. But in the electronic media through which we decided to deliver the survey, it was impossible to measure this. Therefore, discriminability was not selected as one of our evaluation parameters. However, the discriminability of a symbol within a set is relevant.

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d) Visibility

This attribute referred to the ability of the respondent to identify the symbols under degraded conditions. Being most commonly used to measure Symbolic Road Signs, it was considered as irrelevant for our testing. The constant presence of the symbols in the users' close field of view, the screen, made degraded conditions of visibility difficult to occur. The only case would be a poor quality display of the monitor, which would come to be a hardware problem that would make any computer task impossible and would make the user avoid the total use of the computer. Therefore, visibility was not selected as an evaluation parameter for our test.

e) Comprehensibility

According to Foster (1994) this attribute was the most common approach of evaluation, as it assessed whether the symbol communicated the intended meaning. Because of its reference to the symbols' meanings, comprehensibility was an attribute we would certainly use as an evaluation parameter. Nevertheless, there was an issue to take in account for this attribute.

The apparent simplicity of this issue has given rise to a number of procedures for assessing the comprehensibility of symbols. (p. 190)

As stated above, there were several approaches to structure a comprehensibility test, therefore each of these approaches had to be analyzed to decide which could help reach the objectives most effectively.

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The analysis showed 6 different approaches which could be defined as follows:

1. Free response
2. Multiple meaning choice
3. Meaning-symbol match
4. Bipolar scale
5. Rating scale
6. Meaning recall

For free response, a symbol was shown to the respondents and they were simply asked to describe what it meant to them.

For multiple meaning choice, respondents were asked to choose one response from a limited set of potential meanings, that which would relate better to one symbol.

For meaning-symbol match, the respondents were asked to indicate, from equal sets of symbols and meanings, which ones related better to each other.

For bipolar scale, the respondents were presented with a symbol and a meaning, and asked to select from a bipolar scale (with opposite adjectives in each end, i.e. 'vague'/'clear') where their relationship fell. The scale could have five, six or seven possible selections in-between.

For rating scale, the respondents were presented with a symbol and a meaning and asked to select from a categorized scale (with one positive end, i.e. 'very easy to understand' and one negative end, i.e. 'very difficult to understand') which response in their opinion represented best the relationship among the two elements. This scale usually had a middle neutral step (i.e. 'neither difficult, nor easy to understand') and two or three other steps in-between the middle and the ends.

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For meaning recall, the respondents were presented with symbols and told their meanings, and after a certain period of time (usually one week) they were asked to recall the meanings of the symbols.

After analyzing all these approaches against our objectives and parameters we selected the Rating scale as the best option, considering we were working in an environment in which the referents for the symbols will be familiar to the evaluators. Our intention was not to find the best meanings for the symbols, but rather to depict symbols that could fit their meanings successfully: we had to measure the accuracy of the symbols to represent Webmail referents.

The Bipolar scale was considered, but in order to define a clear perception in the responses of the users it was better to give them specific answers to choose from rather than a simple scale to rate the accuracy of the correspondence between symbols and meanings. It seemed more appropriate to use the Bipolar scale for parts of the survey in which the users were asked to rate personal experiences and preferences referred to Webmail in general. We discarded all the other approaches for the symbol's testing.

f) Behavioural Effect

The final depiction of these symbols was certainly intended to affect the behaviour of the users towards a better and more accurate use of Webmail. They had been designed to work harmoniously as a set of tools that would be displayed and used together as a single interface.

But in order to measure how much the users' behaviour had been influenced by the symbols towards an improved performance, the symbols should be tested in real working environments. It was indeed difficult to achieve this without having the symbols undergone a comprehensibility test first. This

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stated clearly that this attribute could not be used as one of our evaluation parameters in this stage.

g) Users And Context

After defining these attributes, Foster (1994) questioned the relationship of the users with three important factors: Should the users have been familiar with a) the symbols, or b) with the meanings, or c) with the context in which the symbols would be used? We considered important to clarify these questions according to the framework of our project.

a) Should the symbols have been familiar? Foster (1994) related this to important factors:

Assessing the comprehensibility of novel symbols poses a special problem, and researchers have used comprehension recall or a comprehensibility rating task to overcome it. When assessing discriminability, studies of symbols for specialist users... ensure that they are familiar with the symbol set, as this reflects actual usage. But for public information symbols, Zwaga and Easterby (1984) recommend that there should be no prior familiarisation. (p. 199)

Even though the symbols here examined were not considered 'Public Information Symbols' we found important to keep the symbols unknown to the user prior the evaluation. Certainly the fact that some of the designs were based on known symbols would already give a certain 'familiarity' feeling to the evaluators. But still, considering the media environment in which these symbols were intended to work, they could still be marked as 'unfamiliar'.

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b) Should the referents have been familiar? A note from Foster (1994) could answer this:

When testing the ability of people to interpret symbols, respondents must be familiar with the referents: it makes a little sense to ask people what a symbol denotes or refers to if they have no concept to which they can refer to. (p. 200)

Certainly this suited the objectives of the comprehension test. The subjects of this evaluation would have some knowledge of the symbols' meanings, as the questions would be presented after showing the symbol and the referent.

c) Should the context of the symbol have been familiar? According to Foster (1994):

A symbol simply presented in isolation with a request for a statement of its meaning may lead to lower comprehension than would occur if the symbol were presented in its conventional context. Context-free presentation may seriously underestimate how comprehensible a symbol would be in a real situation, and therefore it is sensible to provide the correspondent with an indication of the context within which a symbol would be seen. However, there is a need to think about how the contextual information should be provided and how precise it should be. (p. 200)

Given that the target audience were all Web users, and that the symbols were intended for Webmail, it was understood that the context of the sym-

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bols would be clear to the subjects. To erase all uncertainty about clarity of the context, a brief description would be given in an introduction prior the evaluation.

h) Questions for the Comprehension Test

After having chosen comprehensibility as the primary evaluation parameter, questions had to be prepared. These questions would structure the testing of the symbols accordingly, and then proceed with the final elaboration of the whole survey.

Easterby and Zwaga (1984) defined the comprehensibility test under the directives of the ISO procedures, which evaluated a series of symbols for a referent against a population sample:

The purpose of the comprehension/recognition test in the ISO evaluation procedure is to determine which one of a number of symbol variants for a referent is best comprehended by a sample of respondents representative of the user population. (p. 282)

A particular situation happened here, as the symbols tested were merely single variants for each referent (meaning) and it seemed that this evaluation, according to the ISO procedures, was not a proper comprehension test. Nevertheless, Easterby and Zwaga (1984) did an important clarification afterwards about this matter.

In our original work (Easterby and Zwaga, 1976) we referred to this procedure as a 'recognition' test... we now believe this to be an inappropriate description; the respondent really

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needs to comprehend a symbol (understand its meaning) as opposed to merely class it as a symbol he recognises. (p. 282)

By this statement it was considered that using the selected Rating scale method to measure Webmail symbols against their meanings (referents) fulfilled the researchers' description of 'comprehension' test. We then proceeded to apply this Rating scale through proper questions that could be addressed to the subjects, a representative sample of our target audience.

The testing of the symbols would constitute the main part of the survey; we then had to define questions which answers could give us quantitative information concerning the comprehensibility of the symbols.

To prepare the right questions, research throughout Information Design sources was done. We found an interesting design formula created by Mijksenaar (1997) based on the work of the Roman architect Vitruvius. Mijksenaar defined three qualities he referred to as Reliability, Utility and Satisfaction, which any product should fulfill in order to be considered good.

After analyzing Mijksenaar's perspective and source, we found that the inherent meaning of these qualities stated three basic concepts: Significance (meaning), Preservation (time), and Aesthetic (pleasure), we then used these concepts to structure the questions that should fulfill our information requirements.

Before presenting the final questions, it has to be clarified that each symbol and its referent (meaning) would be displayed together just before the question was stated. After that, their answer rating scales with 5 possible responses would follow. The questions were:

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1. - How do you think users will find the relation between meaning and symbol?

This question addressed significance, aiming for a response that could quantify the level of comprehensibility of both symbol and meaning for the user. Its answer rating scale was:

- * Very difficult to understand
- * Rather difficult to understand
- * Neither difficult nor easy to understand
- * Rather easy to understand
- * Very easy to understand

2. - How do you think it will be for the users to remember the relationship between meaning and symbol?

This question addressed preservation, aiming for a response that could quantify the level of learnability of the symbol: how easy or difficult could the relationship be remembered, and therefore learned. Its answer rating scale was:

- * Very difficult to remember
- * Rather difficult to remember
- * Neither difficult nor easy to remember
- * Rather easy to remember
- * Very easy to remember

3. - How do you think users will find the aesthetics of the symbol?

This question addressed pure aesthetic, aiming for a response that could fulfill one of our secondary objectives, obtain results regarding preferred aesthetical styles from the symbols. Its answer rating scale was:

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- * Very unpleasant
- * Rather unpleasant
- * Neither unpleasant nor pleasing
- * Rather pleasing
- * Very pleasing

Once the format of the questions that would structure the testing of the symbols was ready, we could proceed with the final elaboration of the whole survey.

2.7. Experiment Application

After the definition of all the parameters and the preparation of the evaluation questions for the comprehensibility test, the implementation of these directives should be put to work into the physical creation of the Online Survey itself. After that, the survey could be uploaded on the Web for evaluation.

The survey was programmed using the HTML programming language, commonly used for Web applications and browser display. The database program File Maker Pro was selected to gather the information from the survey and store it into a database file. In this way the information could be accessed and processed easily after having gathered the required number of replies.

In order to fulfill the structure and format parameters, the body of the survey was divided in four sections. The programming was prepared accordingly. The structure of the third section of the questionnaire was explained in the previous section; the other three will be described in the following paragraphs. A sample of the final survey can be found at the Appendix.

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a) General Information

The objective of this section was to gather information about the respondents, in order to categorize them in fields. This information could be used as reference when processing the final results. Gender and age were the obvious main fields to use. Educational level, annual income and daily activity were other fields included for categorization.

Three other fields were included at the end of this section: country of residence, native country and proficiency level in the English language. Because of the variety of the target audience and the nature of the symbols, a reference to these facts was considered important. Web users are spread around the globe, they access it from many countries in the world and not all of them possess equal vocabularies in English. This was important as in earlier analyses it was found that English is one of the most common languages used by Webmail providers.

b) General Approach Towards Webmail

The objective of this section was to obtain quantitative information about the users' personal preferences towards Webmail. For these questions a Bipolar scale was used, requesting the users to rate the answers in the scale, according to their experience.

The questions asked in this section targeted specific issues about the interface and general use of Webmail. This information was considered valuable in order to understand the subjects' experience in the Web. These data would provide arguments that will help us define patterns in the use of Webmail, from actual users.

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c) Testing Webmail Symbols

This section was prepared carefully, aiming to fulfill two of the main objectives of this project: 1) obtain results regarding the comprehensibility of Webmail symbols (*primary*), and 2) obtain results regarding preferred aesthetical styles for these symbols (*secondary*). This section has been described previously.

d) Extended Participation

The objective of this section was to obtain qualitative information about the users' personal opinion towards Webmail. For this section open questions were used, giving the respondents freedom to answer in their own words. Some questions of this section aimed to fulfill two of the *secondary* objectives of this project: obtain information regarding a) the use of symbols or key-words as interface elements, and b) the use of Webmail as an international communication tool. The users were asked to respond 'freely and openly', instead of categorizing answers.

Once the structure was ready, the conversion of all this information into HTML code followed. Colleagues in Canada, Mexico and The Netherlands lend support with conducting the Beta tests, using different computers and different browsers. This way, we could be as certain as possible that the file could be accessed from anywhere without technical problems. When all colleagues had reported a successful reception and operation of the file, the final version of the survey was developed.

A server provided by the Department of Art and Design, in the Visual Communication Research Laboratory, was used to host the survey online. The equipment used was a Macintosh G4 in which the HTML code was programmed to run from the database program, File Maker Pro. On February 10th the survey was posted on the Internet running 24 hours a day, 7 days a week.

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In order to gather the 96 users (needed to complete a dependable sample of the audience), an Email was sent to approximately 120 potential evaluators all over North America, Latin America and Western Europe, inviting them to participate in the experiment. They were also asked to extend the request for participation to any person they wanted. The message provided a brief explanation of the project and a hyperlink to the Internet address of the survey. Our goal number was expected to be reached in four weeks.

2.8. Results

After 15 days of having the survey online the 96 replies were reached, and by the time the survey was taken down the Internet there were 125 answers. Once all the data was gathered it had to be analyzed and interpreted. File Maker Pro was used to categorize the information, processed afterwards through Excel, to prepare the final outcomes.

To keep a logical schema, the same four-section structure of the survey was used. We will report on the questions of each section, presenting visuals for an easy and accurate display of the results. Gender was the main category, and the information in the tables was organized by the number of individuals per gender, individual gender-average, total gender percentages, total number of individuals and total individuals' percentages.

a) General Information

Our highest response group were females between 16 and 25 years old. Canada, Mexico, and the Netherlands were the most represented countries, reaching together almost the 65% of responses; and from the three different world regions we intended to cover, Latinamerica was the most highly ranked with almost half (49%) of the participants.

Our evaluators also reported a high level of education: almost half of them (48%) with a bachelor's degree and another high percentage (40%) with a

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graduate degree; and from the total number of respondents 51% replied studies to be their main occupation. They reported a general high level of knowledge of the English language, 46% of them replied being native speakers and 38% reported a very good knowledge level of the language.

Gender

From our 125 respondents (100%):

- * 71 were Female (57%)
- * 54 were Male (43%)

Age Group

From our 125 respondents (100%):

- * 59 were between 16 and 25 (47%)
 - 36 Female (29%), 23 Male (18%)
- * 35 were between 26 and 30 (28%)
 - 22 Female (18%), 13 Male (10%)
- * 16 were between 31 and 40 (13%)
 - 5 Female (4.2%), 11 Male (8.8%)
- * 12 were between 41 and 50 (9.6%)
 - 6 Female (4.8%), 6 Male (4.8%)
- * 3 were Over 50 years old (2.4%)
 - 2 Female (1.6%), 1 Male (0.8%)
- * Zero under 16 years old responded (0%)

Native Country

From our **125** respondents (100%):

- * 44 (35%) replied from Mexico
- * 29 (23%) replied from Canada
- * 11 (8.8%) replied from The Netherlands
- * 10 (8.0%) replied from the United States
- * 6 (4.8%) replied from the United Kingdom

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- * 3 (2.4%) replied from each Australia and Germany
- * 2 (1.6%) replied each from France, Spain and Sweden
- * 1 (0.8%) replied from each Argentina, Austria, Brasil, Colombia, Cuba, Greece, Guyana, Hungary, India, Switzerland and Taiwan
- * 2 (1.6%) replied with No country indicated

We grouped these countries in three main regions, Latin America, Canada & U.S., and Europe. A fourth region was added for other countries. These regions were mainly categorized by their technological development and Internet access. Refer to Appendix for the source data.

Education Level

From our 125 respondents (100%):

- * 60 (48%) reported being studying for/having a Bachelor degree
35 Female (28%), 25 Male (20%)
- * 50 (40%) reported being studying for/having a Graduate degree
28 Female (22%), 22 Male (18%)
- * 12 (9.6%) reported being studying/having a Professional/Technical degree
7 Female (5.6%), 5 Male (4.0%)
- * 2 (1.6%) reported being studying for/having a High School degree
1 Female (0.8%), 1 Male (0.8%)
- * 1 Male (48%) reported being studying for/having Other kind of degree

Daily Activity

From our 125 respondents (100%):

- * 59 (47%) reported work as their main activity
- * 51 (41%) reported studies as their main activity
- * 13 (10%) reported nothing as their main activity
- * 2 (1.6%) reported other as their main activity

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Knowledge of English

From our 125 respondents (100%):

- * 46 (37%) reported having English as their Native language
27 Female (22%), 19 Male (15%)
- * 38 (30%) reported having a Very Good knowledge of English
20 Female (16%), 18 Male (14%)
- * 20 (16%) reported having a Good knowledge of English
10 Female (8%), 10 Male (8%)
- * 12 (9.6%) reported having an Extensive knowledge of English
7 Female (5.6%), 5 Male (4%)
- * 7 (5.6%) reported having a Regular knowledge of English
6 Female (4.8%), 1 Male (0.8%)
- * 2 (1.6%) reported having a Basic knowledge of English
1 Female (0.8%), 1 Male (0.8%)

Annual Income

Because of the variations on currency exchange and confuse answers from the respondents, this category became almost useless. Nevertheless, we processed the data for the records. Refer to Appendix for the source data.

b) General Approach Towards Webmail

More than half our respondents (52%) considered Webmail as a highly over-rated service in an evaluation related to its utility, value, need and importance. They also reported a high use of Webmail, 64% making use of this service at least twice a week, if not daily. Almost half of the subjects (46%) reported using Hotmail as their main Webmail provider. And learning how to use Webmail was not considered as a difficult task for our respondents (61%), in spite of Webmail's lack of instructions to operate.

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Main Webmail Provider

From our 125 respondents (100%):

- * 58 (46%) reported using Hotmail as their main Webmail provider
32 Female (26%), 26 Male (21%)
- * 20 (16%) reported using Yahoo! as their main Webmail provider
11 Female (8.8%), 9 Male (7.2%)
- * 23 (18.4%) reported other Webmail providers (under 5% of participation)
13 Female (10.4%), 10 Male (8%)
- * 24 (19%) reported no answer for this particular question
15 Female (12%), 9 Male (7.2%)

Frequency of Use

From our 125 respondents (100%):

- * 52 (42%) reported using Webmail several times a day
35 Female (28%), 17 Male (14%)
- * 28 (22%) reported using Webmail several times a week
10 Female (8%), 18 Male (14%)
- * 19 (15%) reported no answer for this particular question
11 Female (15%), 8 Male (6.4%)
- * 14 (11%) reported using Webmail several times a year
5 Female (5%), 9 Male (7.2%)
- * 11 (8.8%) reported using Webmail several times a month
9 Female (7.2%), 2 Male (1.6%)
- * 1 female (0.8%) reported not using Webmail at all

Webmail Opinion

From our 125 respondents (100%):

- * 108 (86.4%) considered Webmail useful in general
62 Female (49.6%), 46 Male (36.8%)
- * 106 (84.8%) considered Webmail valuable in general
61 Female (48.8%), 45 Male (36%)

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- * 93 (74.4%) considered Webmail necessary in general
54 Female (43.2%), 39 Male (31.2%)
- * 96 (76.8%) considered Webmail important in general
55 Female (44%), 41 Male (32.8%)
- * An average of 7 (5.6%) reported no answer

Subjects were requested to evaluate their own Webmail provider with questions about the general structure of the account and the keyword interface of their account. As well, further questions regarding the learning process of their account's operability were asked.

Webmail Evaluation: Structure

From our 125 respondents (100%):

- * 65 (52%) considered their Webmail structure as clear in general
40 Female (32%), 25 Male (20%)
- * 73 (58.4%) considered their Webmail structure as organized in general
44 Female (35.2%), 29 Male (23.2%)
- * 80 (64%) considered their Webmail structure easy to understand in general
47 Female (37.6%), 33 Male (26.4%)
- * An average of 24 (19.2%) reported no answer

Webmail Evaluation: Interface

From our 125 respondents (100%):

- * 63 (50.4%) considered their Webmail's interface as clear in general
38 Female (30.4%), 25 Male (20%)
- * 69 (55.2%) considered their Webmail's interface as organized in general
40 Female (32%), 29 Male (23.2%)
- * 68 (54.4%) considered their Webmail's interface as easy to understand in general
40 Female (32%), 28 Male (22.4%)
- * An average of 26 (20.8%) reported no answer

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Webmail Learning Process: General Questions

From our 125 respondents (100%):

- * 84 (67.2%) considered their Webmail easy to learn in general
47 Female (37.6%), 37 Male (29.6%)
- * 70 (56%) considered their Webmail fast to learn in general
42 Female (33.6%), 28 Male (22.4%)
- * 74 (59.2%) considered their Webmail simple to learn in general
44 Female (35.2%), 30 Male (24%)
- * An average of 23 (18.4%) reported no answer

Webmail Learning Process: Specific Questions

From our 125 respondents (100%):

- * 86 (68.8%) reported finding where to get their new email as an easy task
46 Female (36.8%), 40 Male (32%)
- * 78 (62.4%) reported finding where to write a new email as an easy task
44 Female (35.2%), 34 Male (27.2%)
- * 59 (47.2%) reported finding where to organize their received email as an easy task
33 Female (26.4%), 26 Male (20.8%)
- * 71 (56.8%) reported finding where to exit their account as an easy task
42 Female (33.6%), 29 Male (23.2%)
- * An average of 21 (16.8%) reported no answer

c) Webmail Symbol's Testing

This was the core of the survey and the answers delivered by the respondents gave us a final verdict on the Webmail symbols we prepared for this test. The following are interpretations of the answers provided by the evaluators. According to our research, the first question addressed the comprehensibility of the symbol to its referent, the second question addressed the learnability of the symbol to its referent, and the third question addressed preferred aesthetics for the symbol.

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Get New Email

From our 125 respondents (100%): 1 (0.8%) replied with no answers

- * 75 (60%) rated this symbol with a high potential of comprehensibility
48 Female (38.4%), 27 Male (21.6%)
- * 16 (12.8%) rated this symbol with a low potential of comprehensibility
5 Female (4%), 11 Male (8.8%)
- * 103 (82.4%) rated this symbol with a high potential of learnability
62 Female (49.6%), 41 Male (32.8%)
- * 5 (4%) rated this symbol with a low potential of learnability
0 Female (0%), 5 Male (4%)
- * 71 (56.8%) rated this symbol with a high aesthetical potential
48 Female (38.4%), 23 Male (18.4%)
- * 7 (5.6%) rated this symbol with a low aesthetical potential
2 Female (1.6%), 5 Male (4%)



Write Email

From our 125 respondents (100%): 1 (0.8%) replied with no answers

- * 120 (96%) rated this symbol with a high potential of comprehensibility
69 Female (55.2%), 51 Male (40.8%)
- * 3 (2.4%) rated this symbol with a low potential of comprehensibility
0 Female (0%), 3 Male (2.4%)
- * 120 (96%) rated this symbol with a high potential of learnability
70 Female (56%), 50 Male (40%)
- * 2 (1.6%) rated this symbol with a low potential of learnability
0 Female (0%), 2 Male (1.6%)
- * 91 (72.8%) rated this symbol with a high aesthetical potential
54 Female (43.2%), 37 Male (29.6%)
- * 3 (2.4%) rated this symbol with a low aesthetical potential
0 Female (0%), 3 Male (2.4%)

*Reply Email*

From our 125 respondents (100%): 1 (0.8%) replied with no answers

- * 31 (24.8%) rated this symbol with a high potential of comprehensibility
21 Female (16.8%), 10 Male (8%)
- * 60 (48%) rated this symbol with a low potential of comprehensibility
35 Female (28%), 25 Male (20%)
- * 46 (36.8%) rated this symbol with a high potential of learnability
25 Female (20%), 21 Male (16.8%)
- * 39 (31.2%) rated this symbol with a low potential of learnability
24 Female (19.2%), 15 Male (12%)
- * 37 (29.6%) rated this symbol with a high aesthetical potential
25 Female (20%), 12 Male (9.6%)
- * 24 (19.2%) rated this symbol with a low aesthetical potential
11 Female (8.8%), 13 Male (10.4%)

*Forward Email*

From our 125 respondents (100%): 1 (0.8%) replied with no answers

- * 40 (32%) rated this symbol with a high potential of comprehensibility
23 Female (18.4%), 17 Male (13.6%)
- * 49 (39.2%) rated this symbol with a low potential of comprehensibility
28 Female (22.4%), 21 Male (16.8%)
- * 55 (44%) rated this symbol with a high potential of learnability
33 Female (26.4%), 22 Male (17.6%)
- * 32 (25.6%) rated this symbol with a low potential of learnability
17 Female (13.6%), 15 Male (12%)
- * 35 (28%) rated this symbol with a high aesthetical potential
25 Female (20%), 10 Male (8%)
- * 21 (16.8%) rated this symbol with a low aesthetical potential
9 Female (7.2%), 12 Male (9.6%)

Project development



Open Address Book

From our 125 respondents (100%): Nobody (0%) replied with no answers

- * 87 (69.6%) rated this symbol with a high potential of comprehensibility
52 Female (41.6%), 35 Male (28%)
- * 17 (13.6%) rated this symbol with a low potential of comprehensibility
7 Female (5.6%), 10 Male (8%)
- * 104 (83.2%) rated this symbol with a high potential of learnability
62 Female (49.6%), 42 Male (33.6%)
- * 7 (5.6%) rated this symbol with a low potential of learnability
3 Female (2.4%), 4 Male (3.2%)
- * 82 (65.6%) rated this symbol with a high aesthetical potential
53 Female (42.4%), 29 Male (23.2%)
- * 5 (4%) rated this symbol with a low aesthetical potential
3 Female (2.4%), 2 Male (1.6%)



Organize Folders

From our 125 respondents (100%): Nobody (0%) replied with no answers

- * 68 (54.4%) rated this symbol with a high potential of comprehensibility
42 Female (33.6%), 26 Male (20.8%)
- * 31 (24.8%) rated this symbol with a low potential of comprehensibility
14 Female (11.2%), 17 Male (13.6%)
- * 81 (64.8%) rated this symbol with a high potential of learnability
49 Female (39.2%), 32 Male (25.6%)
- * 18 (14.4%) rated this symbol with a low potential of learnability
9 Female (7.2%), 9 Male (7.2%)
- * 52 (41.6%) rated this symbol with a high aesthetical potential
32 Female (25.6%), 20 Male (16%)
- * 11 (8.8%) rated this symbol with a low aesthetical potential
6 Female (4.8%), 5 Male (4%)

Project development



Save Email

From our 125 respondents (100%): Nobody (0%) replied with no answers

- * 20 (16%) rated this symbol with a high potential of comprehensibility
13 Female (10.4%), 7 Male (5.6%)
- * 85 (68%) rated this symbol with a low potential of comprehensibility
44 Female (35.2%), 41 Male (32.8%)
- * 34 (27.2%) rated this symbol with a high potential of learnability
18 Female (14.4%), 16 Male (12.8%)
- * 50 (40%) rated this symbol with a low potential of learnability
25 Female (20%), 25 Male (20%)
- * 32 (25.6%) rated this symbol with a high aesthetical potential
25 Female (20%), 7 Male (5.6%)
- * 28 (22.4%) rated this symbol with a low aesthetical potential
11 Female (8.8%), 17 Male (13.6%)



Delete Email

From our 125 respondents (100%): 1 (0.8%) replied with no answers

- * 89 (71.2%) rated this symbol with a high potential of comprehensibility
56 Female (44.8%), 33 Male (26.4%)
- * 22 (17.6%) rated this symbol with a low potential of comprehensibility
9 Female (5.6%), 13 Male (10.4%)
- * 92 (73.6%) rated this symbol with a high potential of learnability
60 Female (48%), 32 Male (25.6%)
- * 16 (12.8%) rated this symbol with a low potential of learnability
7 Female (5.6%), 9 Male (7.2%)
- * 57 (45.6%) rated this symbol with a high aesthetical potential
36 Female (28.8%), 21 Male (16.8%)
- * 21 (16.8%) rated this symbol with a low aesthetical potential
9 Female (7.2%), 12 Male (9.6%)

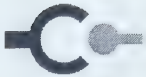
Project development



Connect to Account

From our 125 respondents (100%): 1 (0.8%) replied with no answers

- * 33 (26.4%) rated this symbol with a high potential of comprehensibility
18 Female (14.4%), 15 Male (12%)
- * 59 (47.2%) rated this symbol with a low potential of comprehensibility
33 Female (26.4%), 26 Male (20.8%)
- * 58 (46.4%) rated this symbol with a high potential of learnability
36 Female (28.8%), 22 Male (17.6%)
- * 37 (29.6%) rated this symbol with a low potential of learnability
18 Female (14.4%), 19 Male (15.2%)
- * 61 (48.8%) rated this symbol with a high aesthetical potential
37 Female (29.6%), 24 Male (19.2%)
- * 22 (17.6%) rated this symbol with a low aesthetical potential
7 Female (5.6%), 15 Male (12%)



Disconnect from Account

From our 125 respondents (100%): 1 (0.8%) replied with no answers

- * 40 (32%) rated this symbol with a high potential of comprehensibility
25 Female (20%), 15 Male (12%)
- * 53 (42.4%) rated this symbol with a low potential of comprehensibility
27 Female (21.6%), 26 Male (20.8%)
- * 55 (44%) rated this symbol with a high potential of learnability
36 Female (28.8%), 19 Male (15.2%)
- * 34 (27.2%) rated this symbol with a low potential of learnability
16 Female (12.8%), 18 Male (14.4%)
- * 57 (45.6%) rated this symbol with a high aesthetical potential
34 Female (27.2%), 23 Male (18.4%)
- * 18 (14.4%) rated this symbol with a low aesthetical potential
9 Female (7.2%), 9 Male (7.2%)

Project development

d) Extended Participation

Despite being the previous section the most important of this survey, we were fortunate to receive substantial and valuable feedback from our respondents in this last section. This part turned to be a very important source of information for the entire project, which encourages us to pursue further research in this topic and field.

Although some responses can fall in a pattern, it is difficult to enclose all of them under a few topics and tabulate them. These last questions were answered in a qualitative manner, and so will be reported. A lists with the strongest and most replied answers will be delivered for each question. These answers were edited into smaller sentences that kept their fundamental ideas.

1- Why do you use / do not use free webmail?

DO:

- * Because it's free!
- * It is convenient, accessible from any computer with Internet connection.
- * I can communicate with my friends and family far away, saving in long distance calls.
- * It allows me to send and receive photos / videos / documents.
- * It allows me to have an alternate account from work or school, is more private.
- * It is a steady place in which I can be reached.
- * It is easier to use than Telnet , it has a better interface.

DO NOT:

- * Because I have an account at work / school / my ISP.
- * Because of the busy lines and cost.
(Connection time is charged per minute in other countries).
- * Because it is slow.
- * Because I can't archive my emails.

Project development

2- If you used free webmail and now you don't, what were your reasons?

This question had few replies, many were answered as 'n/a' and 'still use it':

- * I received too much junk mail and advertising.
- * It was difficult to log in sometimes.
- * It was slow and unreliable, some email sent never arrived.
- * It was difficult to manage and organize.
- * It had cluttered interfaces and limited disk quota.
- * I have a new private account now at work / school / my ISP.

3- If English is not your native language, how easy or difficult was for you to understand the "keywords" that free webmail uses in its interface?

We had a high percentage of people with at least a good knowledge of English (92.6%):

- * It was not difficult.
- * It was somewhat difficult.
- * Technical language was difficult, some words are not a logical translation.
- * Not too difficult as computer language is mostly English.
- * Is easy when your webmail offers the service in your language.
- * It was somewhat easy, as I had previous experience with other computer programs.
- * When I didn't understand, I clicked to find out the purpose of each one.
- * Difficult at the beginning, after a while using them they become familiar.

4- If English is your native language, and it was still difficult for you to understand these "keywords", what do you think were the reasons?

- * Some terms are too vague, one word does not give the full meaning.
- * I had trouble with some technical terms because I am not very familiar with computers.
- * Some of them are rather difficult to read and remember.
- * There were so many keywords that I found it difficult to understand.

Project development

- * I have had difficulty in the way that the screen was laid out.
- * I had no problems as I have experience with computers.

5- What is your opinion about using either "keywords" or symbols in order to make use of free webmail?

It was interesting how the majority of these responses referred to one of three particular preferences. The respondents explained their answers with valuable arguments and opinions, but for the purpose of presenting brief results we categorized their answers in three groups:

- * Preference to use *symbols*: 48 persons (38.4%)
- * Preference to use *both* (symbols and keywords): 36 persons (28.8%)
- * Preference to use *keywords*: 17 persons (13.6%)
- * No response or preference: 24 persons (19.2%)

6- How do you think the use of "keywords" the functionality / efficiency of free webmail as an international communication technology?

We found a diversity of answers for this question. Several people misinterpreted the question, answering for 'symbols' instead of 'keywords'. Others responded with just their opinion of Webmail as an international communication technology, without referring to keywords or symbols at all. We found all of them interesting, and we report the most relevant here:

- * Symbols are language-free so they are clearly and potentially more effective.
- * Keywords enhance the efficiency of webmail for the user, but symbols would enhance that usage even more.
- * I think the variables to consider are: speed, time spent, and easier access. All these translate to the effects: functionality/efficiency/loyalty to the server.
- * Keywords would not affect the functionality/efficiency of free webmail.
- * A user interface in different languages would help users who do not speak English and could replace symbols.
- * Keywords would cause problems for anyone that did not have a good grasp of English and therefore would compromise the efficiency.

Project development

- * Unless the site is accessible in different languages, English keywords make a site useless to a foreigner with no knowledge of the language.
- * It's helpful and easier to adjust if all providers use the same keywords.
- * Keywords are similar in many software applications, I foresee no problems when used.
- * Although many people speak English in the world, symbols would obviously transcend every language barrier.
- * Keywords are only efficient if they are very clear in their purpose.
- * A website is more attractive to see with colors and clear symbols.
- * I think the keywords would have to be translated in all languages of the country the mail service is available in.
- * I think keywords have minimum effect, if any.
- * A standard should exist for all webmail providers, but once one gets used to it, I don't consider it very relevant.
- * I haven't heard complaints among international students, and generally feel the placement of keyword/symbol is at least as important as the form of the icon itself.
- * I think that keywords are critical to support the meaning of the symbols.
- * Symbols could be used in order to provide a singular international interface for all users, (no need for language translations).
- * Keywords may bring some problems for people, due to language.
- * I think they don't limit functionality or efficiency in day to day use once a person learns what keywords are.
- * They are useful in providing common ground for all.
- * A "no-smoking" sign means the same in Mexico, France, and China, but the words are completely different. Therefore, keywords are more likely to be misinterpreted.
- * I think the 'transparency' of the keywords is a very important factor for people who are deciding whether or not to sign up with a specific webmail provider.

Project development

- * I think the symbols are a very important gesture of the webmail provider to take their non-native speakers seriously.
- * In some sense, everybody would be using the same language.
- * It is like creating a single international language for all the people using the web.
- * It does affect, specially because they are usually in English and the web is international space, where users from all over the world should understand everything very clearly.
- * I think it should be equally accessible for everyone, and that is not the case right now.
- * Keywords make more functionally and efficient the use of mail accounts.
- * Depends, if the service was offered in different languages.
- * Keywords limits international use, symbols are better.
- * I think keywords limit it!
- * I suppose if a user is from a different community/language background, it would make the 'keyword' approach less efficient.
- * Irrelevant. Webmail is a service provided by some company. If you don't like the service, find a free service that suits your needs. Whether it is with icons or keywords makes no difference. There is no need for standarization because one would stick with one email account.
- * Keywords should always be an option, something to turn off or hide after viewing.
- * If the world can agree on which words to use there is not a problem.
- * Same words for same function helps to make the use of webmail more easy.
- * Sometimes there could bring misunderstandings.
- * Keywords are useful. Many times you do not know what the symbol means, and you need the help of keywords.
- * I don't think it affects the funcionality or efficiency at all. The use of keywords is just an option for the user
- * I think keywords are not as efficient as symbols because people don't speak English very well everywhere.

Discussion

- * It likely does frustrate people currently, until they become used to or have been shown how to use their webmail.
- * Some need to be changed to have a better understanding of what they mean.
- * There are limits to people understanding the verbal language used in free webmail. Trial and error may soon teach the user what their possibilities are, regardless of whether they are given text or visual cues.

3. Discussion

The Results section described how this project fulfilled all the objectives proposed:

- * Design a set of symbols that represent the main interface commands used in Webmail
- * Test this set of symbols against a representative population sample
- * Obtain results regarding the comprehensibility of these symbols
- * Obtain results regarding preferred aesthetical styles for symbols in Webmail
- * Obtain information regarding the use of symbols or keywords as interface elements
- * Obtain information regarding the use of Webmail as an international communication tool

The design of symbols for Webmail represented a difficult task we consider achieved in good terms. Several issues had to be considered in the design process, the most difficult being to define an approach that could address an international audience. The strategy followed was to research among existing symbols and current interfaces to develop a design process that depicted effectively the required referents. Based on the ISO procedures for the development of Public Information symbols we structured the process through which we designed the final symbols and testing method.

Discussion

The symbols designed for Webmail were tested, and interesting results were delivered from real users. According to the ISO procedures, to standardize Public Information Symbols a 66 percent comprehension should be reached to consider a symbol successful in the task of delivering a referent. We developed an evaluation method that addressed the comprehensibility and learnability potential of the symbols.

Considering this the first stage of a standardization process for Webmail symbols, the method developed recommends three parameters to follow, according to the evaluation results:

1. Symbols that score over the criterion are prospects for standardization
2. Symbols that score below the criterion but over a 50% score are recommended for revision and a re-design process
3. Symbols that score below the criterion and below a 50% score need to be designed again from scratch

Based on these parameters we report the symbol's evaluation results as follows.

a) COMPREHENSIBILITY

Results derived from the comprehensibility test were:

Three (3) symbols reached a score over the criterion:

* Write Email	(96.0%)
* Delete Email	(71.2%)
* Open Address Book	(69.6%)

Two (2) symbols reached a score over 50% but below the criterion:

* Get New Email	(60.0%)
* Organize Folders	(54.4%)

Discussion

Five (5) symbols reached a score below 50% and below the criterion:

* Forward Email	(32.0%)
* Disconnect from Account	(32.0%)
* Connect to Account	(26.4%)
* Reply Email	(24.8%)
* Save Email	(16.0%)

b) LEARNABILITY

Results derived from the learnability test were:

Four (4) symbols reached a score over the criterion:

* Write Email	(96.0%)
* Open Address Book	(83.2%)
* Get New Email	(82.4%)
* Delete Email	(73.6%)

One (1) symbol reached a score over 50% but below the criterion:

* Organize Folders	(64.8%)
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Five (5) symbols reached a score below 50% and below the criterion:

* Connect to Account	(46.4%)
* Forward Email	(44.0%)
* Disconnect from Account	(44.0%)
* Reply Email	(36.8%)
* Save Email	(27.2%)

By analyzing the results obtained from these two tests, information for re-design and new development of Webmail symbols was derived.

We consider these tests as mutual-supporting. The comprehensibility test determines how easy is to understand a subject, while the learnability test

Discussion

determines (in case it is difficult to understand at first glance) how easy it can be to learn a subject. In the learning process curve of any subject the ease of comprehension determines the speed with which a subject is learned. Nevertheless the understanding process of a subject is also supported by the potential ease with which that subject can be learned.

We averaged the results obtained by the symbols, in the comprehensibility and learnability tests, in order to determine the parameters that should apply for each of them. According to this we concluded the following:

1. - Four (4) symbols are prospects for standardization

* Write Email	(96.0%)
* Open Address Book	(76.4%)
* Delete Email	(72.4%)
* Get New Email	(71.2%)

2. - One (1) symbol is recommended for revision and a re-design process

* Organize Folders	(59.6%)
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3. - Five (5) symbols need to be designed again from scratch

* Forward Email	(38.0%)
* Disconnect from Account	(38.0%)
* Connect to Account	(36.4%)
* Reply Email	(30.8%)
* Save Email	(21.6%)

c) AESTHETICS

We also addressed aesthetical preferences in the evaluation. The following is a list with the results of this test. Average scores by symbol are rated from the highest to the lowest.

Discussion

Results derived from the preferred aesthetics evaluation were:

- | | |
|----------------------------|---------|
| 1. Write Email | (72.8%) |
| 2. Open Address Book | (65.6%) |
| 3. Get New Email | (56.8%) |
| 4. Connect to Account | (48.8%) |
| 5. Disconnect from Account | (45.6%) |
| 6. Delete Email | (45.6%) |
| 7. Organize Folders | (41.6%) |
| 8. Reply Email | (29.6%) |
| 9. Forward Email | (28.0%) |
| 10. Save Email | (25.6%) |

From the results of this test, aesthetical parameters were defined. These parameters should be applied in the re-design process of the symbols that failed the previous tests.

Symbols that scored high in the scale of 'aesthetically pleasing' (Write Email, Open Address Book, and Get New Email) were designed as a visual metaphor of real objects. This analogical approach seems to enhance the recognition of the symbols' referent.

Symbols that scored medium in the scale of 'aesthetically pleasing' (Connect to Account, Disconnect from Account, Delete Email and Organize Folders) were designed with a more abstract approach. The first two were designed from technical depictions for 'connection', and the latter two were designed from existing symbols in other fields. We will recall the design process of these symbols for analysis.

The Connect/Disconnect symbols were developed from architecture and engineering sources that depicted household lines, such as electric power, telephone, and cable connections. This approach seems to have a highly technical level that failed to depict the action of accessing a Webmail account.

Discussion

The Delete Email symbol was developed from standard prohibition symbols used in the Public Information Symbols field, and the Organize Folders symbol was developed from existing symbols in the computer field. For these cases it was expected that the knowledge-transfer process (taking information from one field and apply it to another) would help make these analogies successful for their referents, but it proved to fail.

Symbols that scored low in the scale of 'aesthetically pleasing' (Reply Email, Forward Email, and Save email) were abstract depictions of actions occurring to the message, developed from the display of the control panels for audio and video players. Again, it was expected that the knowledge-transfer process will help for these cases, making these analogies successful for their referents, but once more it failed.

According to these analyses we concluded the following:

- * The visual-metaphor approach is a successful design method for Webmail symbols
- * Visual analogies of real objects should be addressed when designing Webmail symbols
- * Realistic depictions should be addressed when designing symbols with active referents
- * Abstract depictions should be avoided when designing symbols with active referents
- * The knowledge-transfer process proved to fail as a recognition aid for Webmail symbols
- * Technical analogies should be avoided when designing Webmail symbols

The conclusions derived from this test should be considered as recommendations. More of these recommendations will be addressed later.

Recommendations

4. Recommendations

The recommendations addressed in this section are derived from analyzing the entire work carried out for this project. The richest information came from the fourth section of the survey. The qualitative input provided by the subjects in this section was carefully analyzed. Valuable facts for the development of successful symbols were found.

A high percentage of respondents (80.6%) considered Webmail as a very useful, valuable, important and necessary tool for communication. Respondents considered the following as the main strengths of Webmail: Cost free, Ubiquitous, File exchange, and Easy access. They also considered the following as the main weaknesses of Webmail: Low speed, Limited disk quota, and Complex interface. Several respondents reported that previous experience with other computer software was important to solve the difficulties of a new symbol interface.

The respondents considered symbols to be successful in overcoming the language barriers and enhancing the performance of operating a Webmail account. They also referred to symbols as an important element of an aesthetically pleasing webpage. A preference for symbols scored the highest in an overall rating about using either symbols (38.4%) or keywords (13.6%) for Webmail.

The option of using of symbols supported by keywords was brought to attention by a group of respondents (28.8%). Several of these replies suggested using symbols as the main interface and keywords as a supporting element. Word-processing programs that utilize this method were referred to as examples. In these programs the working interface is mainly structured with symbols and when the user is confused about the referent of any of them, the pointing device is simply allocated over the symbol and a brief definition of the referent appears to cue the user with the meaning of the task that the symbol stands for.

Recommendations

The respondents considered valuable a common interface for the multiple Webmail services offered online. Several visual issues were brought to attention. Dissimilar symbols were considered important to facilitate the discrimination and recognition process in the interface. As an example they referred to Forward Email and Reply Email as confusing symbols, unable to be identified easily because of their similarity. Color was also considered as an important value that could enhance or demerit the interface by addressing different meanings to the same symbol. The red color used in the symbols designed for this project was referred by some respondents as a confusing value that affected their perception of the symbol's referent.

Technical issues were also brought to attention by the respondents. The size of the symbols in the screen was considered an asset for the successful presentation of the symbols. Monitors vary in size and users can suffer from visual limitations that affect their perception of information displayed on the screen. Time spent checking their Webmail account was another important factor considered by the respondents. Graphic files have more computer-weight than programmed keywords, and because of the different connection speeds used to access the Internet, a graphical interface can be more time-consuming than a keyword interface. Nevertheless, in the field of computer graphics different compression algorithms have been developed to overcome this situation: complex images can be compressed enough to have a 'light' computer-weight which can be processed through the slowest connection speed in a competent period time that can compete with a text-only interface, delivering better quality.

From this feedback, and in addition to the recommendations given through the conclusions of the evaluation, the following recommendations should be considered.

Suggestions for further research

- * Symbols are recommended to structure the interface of Webmail services
- * Keywords are recommended to support symbols, using the pointing device display
- * A common interface is recommended to be used throughout different Webmail providers
- * Symbols are recommended to be dissimilar for a better recognition and discrimination
- * Colors are recommended to be used according to findings in psychology about color-perception
- * Technical possibilities and limitations are recommended to be considered in the design of Webmail symbols

5. Suggestions for further research

In addition to the conclusions and recommendations already presented, the following discussion further analyses the present project.

Enrichment and a deeper knowledge of symbol design for the Web was achieved. Research through the fields of cultural anthropology, communication, computer sciences, information, interface and symbol design, human factors, cognitive psychology, rhetoric, survey design, and visual perception enlightened our experience and our work.

We bring to attention an important fact that should be investigated and considered for the evaluation of symbols, not only for this but for other areas related in the design field as well. In addition to counting the positive responses to a symbol, the number and nature of negative responses should also be considered. It is relevant to analyze these negative responses for a better understanding of the process through which the user undergoes before he or she assigns a value to a tested symbol.

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Appendix

"The Design of Symbols for the Electronic Mail in the World Wide Web"

Online Survey for Web Mail Symbol's Testing

Welcome to the Online Survey!

Thank you for participating, this electronic survey is part of my Master of Design thesis research in the design of symbols for the electronic mail in the world wide web, at the University of Alberta.

The purpose of this survey is to collect information regarding the performance of symbols designed for the web-based electronic mail (webmail). Your participation will provide this research with substantial information about the comprehensibility of the symbols. This will set a basis to measure the effectiveness and usability of a symbol system, in comparison to the 'keyword' system that is actually used in webmail.

This survey is about your personal opinion, which means that your answers can never be wrong. Every answer is right, as long as it indicates what you personally think. The questions have been designed to take the most information from the less of your time.

Nevertheless, I will appreciate all the feedback you can give me with your suggestions, opinions, comments or questions. If you are interested, please send me an email anytime to the following address: raul@ualberta.ca

Again, thank you very much for your time and help.

With my best regards,
Raul

INTRODUCTION

In some of the questions you will be asked to choose one answer from a list or category (in round selectors). In other questions you will be asked to choose some or all answers from a list (in square selectors), for these two kinds of options the computer will cue you allowing the selection of only one answer, or several. Finally, others will be open questions, and you will be asked to answer them in a text box. Please answer these open questions with as much detail as possible.

IMPORTANT

All information you provide in this survey will be treated as confidential. We will not use any data for other purpose than this specific research. We will not provide information given by any person in this survey for any other purpose or to any other source.

Thank you again for participating, you can start now with the survey.

SECTION B Questions to measure general attitude about free webmail sites

There are many free webmail providers. At these sites, you can have an account at no cost. What do you think about this kind of service?

1- I think free webmail is:

useless	<input type="radio"/>	1	<input type="radio"/>	2	<input type="radio"/>	3	<input type="radio"/>	4	<input type="radio"/>	5	useful
not valuable	<input type="radio"/>	1	<input type="radio"/>	2	<input type="radio"/>	3	<input type="radio"/>	4	<input type="radio"/>	5	valuable
not necessary	<input type="radio"/>	1	<input type="radio"/>	2	<input type="radio"/>	3	<input type="radio"/>	4	<input type="radio"/>	5	necessary
not important	<input type="radio"/>	1	<input type="radio"/>	2	<input type="radio"/>	3	<input type="radio"/>	4	<input type="radio"/>	5	important

2- I have seen, and/or worked with, and/or have an account with, the following free webmail providers:

Hotmail	<input type="checkbox"/>	have seen	<input type="checkbox"/>	worked with	<input type="checkbox"/>	have an account
Yahoo!	<input type="checkbox"/>	have seen	<input type="checkbox"/>	worked with	<input type="checkbox"/>	have an account
UsaNet	<input type="checkbox"/>	have seen	<input type="checkbox"/>	worked with	<input type="checkbox"/>	have an account
Netscape	<input type="checkbox"/>	have seen	<input type="checkbox"/>	worked with	<input type="checkbox"/>	have an account
Excite	<input type="checkbox"/>	have seen	<input type="checkbox"/>	worked with	<input type="checkbox"/>	have an account
ICQ-mail	<input type="checkbox"/>	have seen	<input type="checkbox"/>	worked with	<input type="checkbox"/>	have an account
Starmedia	<input type="checkbox"/>	have seen	<input type="checkbox"/>	worked with	<input type="checkbox"/>	have an account
Other:		_____		_____		_____

*The following questions relate to **the first times** you used a free webmail site, if you have never used one of these services, please refer to **Section C**. Thank you.*

3- The free webmail provider I use (the most) is: |_____|

4- I make use of free webmail:

- ☐ never
- ☐ few times a year
- ☐ few times a month
- ☐ few times a week
- ☐ (almost) every day

5- The first times I used it, I considered the structure of my free webmail as:

vague	<input type="radio"/>	1	<input type="radio"/>	2	<input type="radio"/>	3	<input type="radio"/>	4	<input type="radio"/>	5	clear
disorganized	<input type="radio"/>	1	<input type="radio"/>	2	<input type="radio"/>	3	<input type="radio"/>	4	<input type="radio"/>	5	well organized
hard to understand	<input type="radio"/>	1	<input type="radio"/>	2	<input type="radio"/>	3	<input type="radio"/>	4	<input type="radio"/>	5	easy to understand

6- The first times I used it, I considered my free webmail's 'keyword' interface:

vague	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	clear
disorganized	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	well organized
hard to understand	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	easy to understand

7- Finding where to get my new email was:

difficult	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	easy
-----------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	------

8- Finding where to write an email was:

difficult	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	easy
-----------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	------

9- Finding where to organise my received email was:

difficult	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	easy
-----------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	------

10- Finding where to exit my free webmail account was:

difficult	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	easy
-----------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	------

11- Learning how to use my free webmail service was:

difficult	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	easy
slow	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	fast
complicated	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	simple

SECTION C Questions to test the comprehensibility and learnability of the symbols

In this section we will present symbols designed to represent some of the basic functions that free webmail has, and then ask you specific questions about them.

A.- GET NEW EMAIL



1- How do you think users will find the relation between meaning and symbol?

- ☐ very difficult to understand
- ☐ rather difficult to understand
- ☐ neither difficult nor easy
- ☐ rather easy to understand
- ☐ very easy to understand

2- How do you think it will be for the users to remember the relationship between meaning and symbol?

- ☐ very difficult to remember
- ☐ rather difficult to remember
- ☐ neither difficult nor easy
- ☐ rather easy to remember
- ☐ very easy to remember

3- How do you think users will find the aesthetics of the symbol?

- ☐ very unpleasant
- ☐ rather unpleasant
- ☐ neither unpleasant nor pleasing
- ☐ rather pleasing
- ☐ very pleasing

B.- WRITE EMAIL



1- How do you think users will find the relation between meaning and symbol?

- ☐ very difficult to understand
- ☐ rather difficult to understand
- ☐ neither difficult nor easy
- ☐ rather easy to understand
- ☐ very easy to understand

2- How do you think it will be for the users to remember the relationship between meaning and symbol?

- ☐ very difficult to remember
- ☐ rather difficult to remember
- ☐ neither difficult nor easy
- ☐ rather easy to remember
- ☐ very easy to remember

3- How do you think users will find the aesthetics of the symbol?

- ☐ very unpleasant
- ☐ rather unpleasant
- ☐ neither unpleasant nor pleasing
- ☐ rather pleasing
- ☐ very pleasing

C.- REPLY EMAIL



1- How do you think users will find the relation between meaning and symbol?

- ☐ very difficult to understand
- ☐ rather difficult to understand
- ☐ neither difficult nor easy
- ☐ rather easy to understand
- ☐ very easy to understand

2- How do you think it will be for the users to remember the relationship between meaning and symbol?

- ☐ very difficult to remember
- ☐ rather difficult to remember
- ☐ neither difficult nor easy
- ☐ rather easy to remember
- ☐ very easy to remember

3- How do you think users will find the aesthetics of the symbol?

- ☐ very unpleasant
- ☐ rather unpleasant
- ☐ neither unpleasant nor pleasing
- ☐ rather pleasing
- ☐ very pleasing

D.- FORWARD EMAIL



1- How do you think users will find the relation between meaning and symbol?

- ☐ very difficult to understand
- ☐ rather difficult to understand
- ☐ neither difficult nor easy
- ☐ rather easy to understand
- ☐ very easy to understand

2- How do you think it will be for the users to remember the relationship between meaning and symbol?

- ☐ very difficult to remember
- ☐ rather difficult to remember
- ☐ neither difficult nor easy
- ☐ rather easy to remember
- ☐ very easy to remember

3- How do you think users will find the aesthetics of the symbol?

- ☐ very unpleasant
- ☐ rather unpleasant
- ☐ neither unpleasant nor pleasing
- ☐ rather pleasing
- ☐ very pleasing

E.- OPEN ADDRESS BOOK



1- How do you think users will find the relation between meaning and symbol?

- ☐ very difficult to understand
- ☐ rather difficult to understand
- ☐ neither difficult nor easy
- ☐ rather easy to understand
- ☐ very easy to understand

2- How do you think it will be for the users to remember the relationship between meaning and symbol?

- ☐ very difficult to remember
- ☐ rather difficult to remember
- ☐ neither difficult nor easy
- ☐ rather easy to remember
- ☐ very easy to remember

3- How do you think users will find the aesthetics of the symbol?

- ☐ very unpleasant
- ☐ rather unpleasant
- ☐ neither unpleasant nor pleasing
- ☐ rather pleasing
- ☐ very pleasing

F.- ORGANIZE FOLDERS



1- How do you think users will find the relation between meaning and symbol?

- ☐ very difficult to understand
- ☐ rather difficult to understand
- ☐ neither difficult nor easy
- ☐ rather easy to understand
- ☐ very easy to understand

2- How do you think it will be for the users to remember the relationship between meaning and symbol?

- ☐ very difficult to remember
- ☐ rather difficult to remember
- ☐ neither difficult nor easy
- ☐ rather easy to remember
- ☐ very easy to remember

3- How do you think users will find the aesthetics of the symbol?

- ☐ very unpleasant
- ☐ rather unpleasant
- ☐ neither unpleasant nor pleasing
- ☐ rather pleasing
- ☐ very pleasing

G.- SAVE EMAIL



1- How do you think users will find the relation between meaning and symbol?

- ☐ very difficult to understand
- ☐ rather difficult to understand
- ☐ neither difficult nor easy
- ☐ rather easy to understand
- ☐ very easy to understand

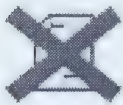
2- How do you think it will be for the users to remember the relationship between meaning and symbol?

- ☐ very difficult to remember
- ☐ rather difficult to remember
- ☐ neither difficult nor easy
- ☐ rather easy to remember
- ☐ very easy to remember

3- How do you think users will find the aesthetics of the symbol?

- ☐ very unpleasant
- ☐ rather unpleasant
- ☐ neither unpleasant nor pleasing
- ☐ rather pleasing
- ☐ very pleasing

H.- DELETE EMAIL



1- How do you think users will find the relation between meaning and symbol?

- ☐ very difficult to understand
- ☐ rather difficult to understand
- ☐ neither difficult nor easy
- ☐ rather easy to understand
- ☐ very easy to understand

2- How do you think it will be for the users to remember the relationship between meaning and symbol?

- ☐ very difficult to remember
- ☐ rather difficult to remember
- ☐ neither difficult nor easy
- ☐ rather easy to remember
- ☐ very easy to remember

3- How do you think users will find the aesthetics of the symbol?

- ☐ very unpleasant
- ☐ rather unpleasant
- ☐ neither unpleasant nor pleasing
- ☐ rather pleasing
- ☐ very pleasing

I.- CONNECT TO ACCOUNT



1- How do you think users will find the relation between meaning and symbol?

- ☐ very difficult to understand
- ☐ rather difficult to understand
- ☐ neither difficult nor easy
- ☐ rather easy to understand
- ☐ very easy to understand

2- How do you think it will be for the users to remember the relationship between meaning and symbol?

- ☐ very difficult to remember
- ☐ rather difficult to remember
- ☐ neither difficult nor easy
- ☐ rather easy to remember
- ☐ very easy to remember

3- How do you think users will find the aesthetics of the symbol?

- ☐ very unpleasant
- ☐ rather unpleasant
- ☐ neither unpleasant nor pleasing
- ☐ rather pleasing
- ☐ very pleasing

J.- DISCONNECT FROM ACCOUNT



1- How do you think users will find the relation between meaning and symbol?

- ☐ very difficult to understand
- ☐ rather difficult to understand
- ☐ neither difficult nor easy
- ☐ rather easy to understand
- ☐ very easy to understand

2- How do you think it will be for the users to remember the relationship between meaning and symbol?

- ☐ very difficult to remember
- ☐ rather difficult to remember
- ☐ neither difficult nor easy
- ☐ rather easy to remember
- ☐ very easy to remember

3- How do you think users will find the aesthetics of the symbol?

- ☐ very unpleasant
- ☐ rather unpleasant
- ☐ neither unpleasant nor pleasing
- ☐ rather pleasing
- ☐ very pleasing

SECTION D Open questions

These are final questions you can answer freely and openly. If any of these questions does not apply to your circumstances, or you do not want to answer, please type n/a inside the box. Thank you for your time.

1- Why do you use / do not use free webmail?

2- If you used free webmail in the past and now you don't , what were your reasons?

3- If English is not your native language, how easy or difficult was for you to understand the 'keywords' that free webmail uses in its interface?

4- If English is your native language, and it was still difficult for you to understand these 'keywords', what do you think were the reasons?

5- What is your opinion about using either 'keywords' or symbols in order to make use of free webmail?

6- How do you think the use of 'keywords' affects the functionality / efficiency of free webmail as an international communication technology?

SUBMIT

RESET

Thank you very much for completing this survey!

For any comments or questions about this survey, please email me to:
raul@ualberta.ca

Questions:*I am: (and) My age is:*

Gender and Age Group	Gender F		Fem %	Gender M		Male %	Tot	
	#	%		#	%		#	%
Under 16	0	0	0	0	0	0	0	0
16 - 25	36	51	29	23	43	18	59	47
26 - 30	22	31	18	13	24	10	35	28
31 - 40	5	7	4	11	20	8.8	16	13
41 - 50	6	8.5	4.8	6	11	4.8	12	9.6
Over 50	2	2.8	1.6	1	1.9	0.8	3	2.4
TOTAL	71	100	57	54	100	43	125	100

Question:*My native country is:*

Country	Gender F		Fem %	Gender M		Male %	Tot	
	#	%		#	%		#	%
Mexico	22	31	18	22	41	18	44	35
Canada	21	30	17	8	15	6.4	29	23
Netherlands	6	8.5	4.8	5	9.3	4	11	8.8
U.S.A.	6	8.5	4.8	4	7.4	3.2	10	8
U.K.	3	4.2	2.4	3	5.6	2.4	6	4.8
Australia	1	1.4	0.8	2	3.7	1.6	3	2.4
Germany	2	2.8	1.6	1	1.9	0.8	3	2.4
France	1	1.4	0.8	1	1.9	0.8	2	1.6
Spain	1	1.4	0.8	1	1.9	0.8	2	1.6
Sweden	1	1.4	0.8	1	1.9	0.8	2	1.6
Unknown	2	2.8	1.6	0	0	0	2	1.6
Argentina	1	1.4	0.8	0	0	0	1	0.8
Austria	1	1.4	0.8	0	0	0	1	0.8
Brasil	0	0	0	1	1.9	0.8	1	0.8
Colombia	0	0	0	1	1.9	0.8	1	0.8
Cuba	0	0	0	1	1.9	0.8	1	0.8
Greece	1	1.4	0.8	0	0	0	1	0.8
Guyana	0	0	0	1	1.9	0.8	1	0.8
Hungary	1	1.4	0.8	0	0	0	1	0.8
India	0	0	0	1	1.9	0.8	1	0.8
Switzerland	0	0	0	1	1.9	0.8	1	0.8
Taiwan	1	1.4	0.8	0	0	0	1	0.8
TOTAL	71	100	57	54	100	43	125	100

World Region	Gender F		Fem %	Gender M		Male %	Tot	
	#	%		#	%		#	%
Latinamerica	23	32	18	26	48	21	49	39
Canada and US	27	38	22	12	22	9.6	39	31
Europe	17	24	14	13	24	10	30	24
Others	4	5.6	3.2	3	5.6	2.4	7	5.6
TOTAL	71	100	57	54	100	43	125	100

Question:		<i>My latest education (or in progress) is:</i>							
Level of Education	Gender F		Fem	Gender M		Male	Tot.	Tot.	
	#	%	%	#	%	%	#	%	
High School	1	1.4	0.8	1	1.9	0.8	2	1.6	
Prof. / Tech.	7	9.9	5.6	5	9.3	4	12	9.6	
Bachelor (Univ.)	35	49	28	25	46	20	60	48	
Graduate (M/PhD.)	28	39	22	22	41	18	50	40	
Other	0	0	0	1	1.9	0.8	1	0.8	
TOTAL	71	100	57	54	100	43	125	100	

Question:		<i>In my daily life, I am:</i>							
Daily Activity	Gender F		Fem	Gender M		Male	Tot.	Tot.	
	#	%	%	#	%	%	#	%	
Student	27	38	22	24	44	19	51	41	
Working	32	45	26	27	50	22	59	47	
Other	1	1.4	0.8	1	1.9	0.8	2	1.6	
No Answer	11	15	8.8	2	3.7	1.6	13	10	
TOTAL	71	100	57	54	100	43	125	100	

Question:		<i>My knowledge of the English language is:</i>							
Knowledge of English	Gender F		Fem	Gender M		Male	Tot.	Tot.	
	#	%	%	#	%	%	#	%	
Native	27	38	22	19	35	15	46	37	
Basic	1	1.4	0.8	1	1.9	0.8	2	1.6	
Regular	6	8.5	4.8	1	1.9	0.8	7	5.6	
Good	10	14	8	10	19	8	20	16	
Very Good	20	28	16	18	33	14	38	30	
Extensive	7	9.9	5.6	5	9.3	4	12	9.6	
TOTAL	71	100	57	54	100	43	125	100	

Question:		<i>My annual income is (reply in ONE currency only):</i>							
Annual Income	Can. \$		Can.	U.S. \$		U.S.	Tot.	Tot.	
	#	%	%	#	%	%	#	%	
Under \$10,000	23	35	18	21	35	17	44	35	
\$10,000 - \$15,000	10	15	8	12	20	9.6	22	18	
\$15,000 - \$25,000	12	18	9.6	12	20	9.6	24	19	
\$25,000 - \$35,000	9	14	7.2	8	13	6.4	17	14	
\$35,000 - \$50,000	6	9.2	4.8	2	3.3	1.6	8	6.4	
Over \$50,000	5	7.7	4	5	8.3	4	10	8	
TOTAL	65	100	52	60	100	48	125	100	

Question:*The free webmail provider I use (the most) is:*

Main Provider	Gender F		Fem %	Gender M		Male %	Tot.	Tot.
	#	%		#	%		#	%
MSN Hotmail	32	45	26	26	48	21	58	46
Yahoo!	11	15	8.8	9	17	7.2	20	16
Netscape	3	4.2	2.4	2	3.7	1.6	5	4
UsaNet	2	2.8	1.6	1	1.9	0.8	3	2.4
dds.nl	0	0	0	2	3.7	1.6	2	1.6
ICQmail	2	2.8	1.6	0	0	0	2	1.6
Mailcity	2	2.8	1.6	0	0	0	2	1.6
Altavista	1	1.4	0.8	0	0	0	1	0.8
Canada.com	1	1.4	0.8	0	0	0	1	0.8
Eudoraimail	1	1.4	0.8	0	0	0	1	0.8
Freemove	0	0	0	1	1.9	0.8	1	0.8
gmx.de	0	0	0	1	1.9	0.8	1	0.8
Infosel	0	0	0	1	1.9	0.8	1	0.8
Mail.com	1	1.4	0.8	0	0	0	1	0.8
Mixmail	0	0	0	1	1.9	0.8	1	0.8
Starmedia	0	0	0	1	1.9	0.8	1	0.8
No Answer	15	21	12	9	17	7.2	24	19
TOTAL	71	100	57	54	100	43	125	100

Question:*I make use of free webmail:*

Time of Use	Gender F		Fem %	Gender M		Male %	Tot.	Tot.
	#	%		#	%		#	%
Never	1	1.4	0.8	0	0	0	1	0.8
Yearly	5	7	4	9	17	7.2	14	11
Monthly	9	13	7.2	2	3.7	1.6	11	8.8
Weekly	10	14	8	18	33	14	28	22
Daily	35	49	28	17	31	14	52	42
No Answer	11	15	8.8	8	15	6.4	19	15
TOTAL	71	100	57	54	100	43	125	100

Question:

I think free webmail is:

Think of Webmail	None		Scale 1		Scale 2		Scale 3		Scale 4		Scale 5		TOTAL	
	F	M	F	M	F	M	F	M	F	M	F	M	F	M
Useless - Useful														
gender answers	5	1	0	1	0	1	4	5	15	12	47	34	71	54
total answers		6		1		1		9		27		81		125
each gender %	7	1.9	0	1.9	0	1.9	5.6	9.3	21	22	66	63	100	100
gender %	4	0.8	0	0.8	0	0.8	3.2	4	12	9.6	38	27	57	43
total %		4.8		0.8		0.8		7.2		22		65		100
Not valuable - Valuable														
gender answers	6	1	0	0	0	1	4	7	23	22	38	23	71	54
total answers		7		0		1		11		45		61		125
each gender %	8.5	1.9	0	0	0	1.9	5.6	13	32	41	54	43	100	100
gender %	4.8	0.8	0	0	0	0.8	3.2	5.6	18	18	30	18	57	43
total %		5.6		0		0.8		8.8		36		49		100
Not necessary - Necessary														
gender answers	6	1	2	0	1	3	8	11	18	16	36	23	71	54
total answers		7		2		4		19		34		59		125
each gender %	8.5	1.9	2.8	0	1.4	5.6	11	20	25	30	51	43	100	100
gender %	4.8	0.8	1.6	0	0.8	2.4	6.4	8.8	14	13	29	18	57	43
total %		5.6		1.6		3.2		15		27		47		100
Not important - Important														
gender answers	7	0	1	1	1	3	7	9	20	19	35	22	71	54
total answers		7		2		4		16		39		57		125
each gender %	9.9	0	1.4	1.9	1.4	5.6	9.9	17	28	35	49	41	100	100
gender %	5.6	0	0.8	0.8	0.8	2.4	5.6	7.2	16	15	28	18	57	43
total %		5.6		1.6		3.2		13		31		46		100

In 1 to 5 scales: 1 represents the lowest value and 5 represents the highest value of the scale.

Question:

The first times I used it, I considered the structure of my free webmail as:

Structure of Webmail	None		Scale 1		Scale 2		Scale 3		Scale 4		Scale 5		TOTAL	
	F	M	F	M	F	M	F	M	F	M	F	M	F	M
Vague - Clear														
gender answers	14	11	2	0	3	2	12	16	23	14	17	11	71	54
total answers		25		2		5		28		37		28		125
each gender %	20	20	2.8	0	4.2	3.7	17	30	32	26	24	20	100	100
gender %	11	8.8	1.6	0	2.4	1.6	9.6	13	18	11	14	8.8	57	43
total %		20		1.6		4		22		30		22		100
Disorganized - Wellorganized														
gender answers	14	10	0	0	2	5	11	10	31	19	13	10	71	54
total answers		24		0		7		21		50		23		125
each gender %	20	19	0	0	2.8	9.3	15	19	44	35	18	19	100	100
gender %	11	8	0	0	1.6	4	8.8	8	25	15	10	8	57	43
total %		19		0		5.6		17		40		18		100
Hard - Easy (to understand)														
gender answers	12	10	0	1	2	3	10	7	24	22	23	11	71	54
total answers		22		1		5		17		46		34		125
each gender %	17	19	0	1.9	2.8	5.6	14	13	34	41	32	20	100	100
gender %	9.6	8	0	0.8	1.6	2.4	8	5.6	19	18	18	8.8	57	43
total %		18		0.8		4		14		37		27		100

In 1 to 5 scales: 1 represents the lowest value and 5 represents the highest value of the scale.

Question:

The first times I used it, I considered my free webmail's 'keyword' interface:

Interface of Webmail	None		Scale 1		Scale 2		Scale 3		Scale 4		Scale 5		TOTAL	
	F	M	F	M	F	M	F	M	F	M	F	M	F	M
Vague - Clear														
gender answers	17	10	0	0	4	4	12	15	23	18	15	7	71	54
total answers		27		0		8		27		41		22		125
each gender %	24	19	0	0	5.6	7.4	17	28	32	33	21	13	100	100
gender %	14	8	0	0	3.2	3.2	9.6	12	18	14	12	5.6	57	43
total %		22		0		6.4		22		33		18		100
Disorganized - Well organized														
gender answers	15	9	0	0	1	4	15	12	26	23	14	6	71	54
total answers		24		0		5		27		49		20		125
each gender %	21	17	0	0	1.4	7.4	21	22	37	43	20	11	100	100
gender %	12	7.2	0	0	0.8	3.2	12	9.6	21	18	11	4.8	57	43
total %		19		0		4		22		39		16		100
Hard - Easy (to understand)														
gender answers	17	9	0	0	3	5	11	12	24	22	16	6	71	54
total answers		26		0		8		23		46		22		125
each gender %	24	17	0	0	4.2	9.3	15	22	34	41	23	11	100	100
gender %	14	7.2	0	0	2.4	4	8.8	9.6	19	18	13	5.6	57	43
total %		21		0		6.4		18		37		18		100

In 1 to 5 scales: 1 represents the lowest value and 5 represents the highest value of the scale.

Question:

Learning how to use my free webmail service was:

Learning Webmail	None		Scale 1		Scale 2		Scale 3		Scale 4		Scale 5		TOTAL	
	F	M	F	M	F	M	F	M	F	M	F	M	F	M
Difficult - Easy														
gender answers	13	9	1	0	2	2	8	6	22	20	25	17	71	54
total answer		22		1		4		14		42		42		125
each gender %	18	17	1.4	0	2.8	3.7	11	11	31	37	35	31	100	100
gender %	10	7.2	0.8	0	1.6	1.6	6.4	4.8	18	16	20	14	57	43
total %		18		0.8		3.2		11		34		34		100
Slow - Fast														
gender answers	13	9	2	0	3	3	11	14	23	12	19	16	71	54
total answer		22		2		6		25		35		35		125
each gender %	18	17	2.8	0	4.2	5.6	15	26	32	22	27	30	100	100
gender %	10	7.2	1.6	0	2.4	2.4	8.8	11	18	9.6	15	13	57	43
total %		18		1.6		4.8		20		28		28		100
Complicated - Simple														
gender answers	14	10	0	1	3	3	10	10	22	18	22	12	71	54
total answer		24		1		6		20		40		34		125
each gender %	20	19	0	1.9	4.2	5.6	14	19	31	33	31	22	100	100
gender %	11	8	0	0.8	2.4	2.4	8	8	18	14	18	9.6	57	43
total %		19		0.8		4.8		16		32		27		100

In 1 to 5 scales: 1 represents the lowest value and 5 represents the highest value of the scale.

Questions:
Rating the findability of specific functions of Webmail

Difficult - Easy	None		Scale 1		Scale 2		Scale 3		Scale 4		Scale 5		TOTAL	
	F	M	F	M	F	M	F	M	F	M	F	M	F	M
Finding where to get my new email was:														
gender answers	12	9	2	0	2	1	9	4	13	15	33	25	71	54
total answers		21		2		3		13		28		58		125
each gender %	17	17	2.8	0	2.8	1.9	13	7.4	18	28	46	46	100	100
gender %	9.6	7.2	1.6	0	1.6	0.8	7.2	3.2	10	12	26	20	57	43
total %		17		1.6		2.4		10		22		46		100
Finding where to write an email was:														
gender answers	13	9	2	0	5	2	7	9	11	16	33	18	71	54
total answers		22		2		7		16		27		51		125
each gender %	18	17	2.8	0	7	3.7	9.9	17	15	30	46	33	100	100
gender %	10	7.2	1.6	0	4	1.6	5.6	7.2	8.8	13	26	14	57	43
total %		18		1.6		5.6		13		22		41		100
Finding where to organize my received email was:														
gender answers	13	8	5	4	9	4	11	12	12	15	21	11	71	54
total answers		21		9		13		23		27		32		125
each gender %	18	15	7	7.4	13	7.4	15	22	17	28	30	20	100	100
gender %	10	6.4	4	3.2	7.2	3.2	8.8	9.6	9.6	12	17	8.8	57	43
total %		17		7.2		10		18		22		26		100
Finding where to exit my free webmail account was:														
gender answers	14	8	3	2	5	5	7	10	18	12	24	17	71	54
total answers		22		5		10		17		30		41		125
each gender %	20	15	4.2	3.7	7	9.3	9.9	19	25	22	34	31	100	100
gender %	11	6.4	2.4	1.6	4	4	5.6	8	14	9.6	19	14	57	43
total %		18		4		8		14		24		33		100

In 1 to 5 scales: 1 represents the lowest value and 5 represents the highest value of the scale.

Evaluation of Webmail symbols : Question 1 (symbols 1 – 5)

QUESTION # 1.- : How do you think users will find the relation between meaning and symbol ?

Difficult - Easy To Understand	None		Very D		Rather D		Neutral		Rather E		Very E		TOTAL	
	F	M	F	M	F	M	F	M	F	M	F	M	F	M
Get New Email														
gender answers	1	0	0	1	5	10	17	16	39	23	9	4	71	54
total answers	1		1		15		33		62		13		125	
each gender %	1.4	0	0	1.9	7	19	24	30	55	43	13	7.4	100	100
gender %	0.8	0	0	0.8	4	8	14	13	31	18	7.2	3.2	57	43
total %		0.8		0.8		12		26		50		10		100
Write Email														
gender answers	0	0	0	1	0	2	2	0	14	18	55	33	71	54
total answers		0		1		2		2		32		88		125
each gender %	0	0	0	1.9	0	3.7	2.8	0	20	33	77	61	100	100
gender %	0	0	0	0.8	0	1.6	1.6	0	11	14	44	26	57	43
total %		0		0.8		1.6		1.6		26		70		100
Reply Email														
gender answers	1	0	4	7	31	18	14	19	18	8	3	2	71	54
total answers	1		11		49		33		26		5		125	
each gender %	1.4	0	5.6	13	44	33	20	35	25	15	4.2	3.7	100	100
gender %	0.8	0	3.2	5.6	25	14	11	15	14	6.4	2.4	1.6	57	43
total %		0.8		8.8		39		26		21		4		100
Forward Email														
gender answers	0	0	3	3	25	18	20	16	18	15	5	2	71	54
total answers		0		6		43		36		33		7		125
each gender %	0	0	4.2	5.6	35	33	28	30	25	28	7	3.7	100	100
gender %	0	0	2.4	2.4	20	14	16	13	14	12	4	1.6	57	43
total %		0		4.8		34		29		26		5.6		100
Open Address Book														
gender answers	0	0	0	2	7	8	12	9	32	26	20	9	71	54
total answers		0		2		15		21		58		29		125
each gender %	0	0	0	3.7	9.9	15	17	17	45	48	28	17	100	100
gender %	0	0	0	1.6	5.6	6.4	9.6	7.2	26	21	16	7.2	57	43
total %		0		1.6		12		17		46		23		100

Evaluation of Webmail symbols : Question 1 (symbols 6 – 10)

QUESTION # 1.-

How do you think users will find the relation between meaning and symbol ?

Difficult - Easy To Understand	None		Very D		Rather D		Neutral		Rather E		Very E		TOTAL	
	F	M	F	M	F	M	F	M	F	M	F	M	F	M
Organize Folders														
gender answers	0	0	3	2	11	15	15	11	19	13	23	13	71	54
total answers		0		5		26		26		32		36		125
each gender %	0	0	4.2	3.7	15	28	21	20	27	24	32	24	100	100
gender %	0	0	2.4	1.6	8.8	12	12	8.8	15	10	18	10	57	43
total %		0		4		21		21		26		29		100
Save Email														
gender answers	0	0	17	16	27	25	14	6	11	6	2	1	71	54
total answers		0		33		52		20		17		3		125
each gender %	0	0	24	30	38	46	20	11	15	11	2.8	1.9	100	100
gender %	0	0	14	13	22	20	11	4.8	8.8	4.8	1.6	0.8	57	43
total %		0		26		42		16		14		2.4		100
Delete Email														
gender answers	0	1	2	3	7	10	6	7	25	17	31	16	71	54
total answers		1		5		17		13		42		47		125
each gender %	0	1.9	2.8	5.6	9.9	19	8.5	13	35	31	44	30	100	100
gender %	0	0.8	1.6	2.4	5.6	8	4.8	5.6	20	14	25	13	57	43
total %		0.8		4		14		10		34		38		100
Connect to Account														
gender answers	0	0	10	9	23	17	20	13	13	12	5	3	71	54
total answers		0		19		40		33		25		8		125
each gender %	0	0	14	17	32	31	28	24	18	22	7	5.6	100	100
gender %	0	0	8	7.2	18	14	16	10	10	9.6	4	2.4	57	43
total %		0		15		32		26		20		6.4		100
Disconnected from Account														
gender answers	1	0	8	11	19	15	18	13	16	10	9	5	71	54
total answers		1		19		34		31		26		14		125
each gender %	1.4	0	11	20	27	28	25	24	23	19	13	9.3	100	100
gender %	0.8	0	6.4	8.8	15	12	14	10	13	8	7.2	4	57	43
total %		0.8		15		27		25		21		11		100

Evaluation of Webmail symbols : Question 2 (symbols 1 – 5)

QUESTION # 2.-

How do you think it will be for the users to remember the relationship between meaning and symbol ?

Difficult - Easy To Understand	None		Very D		Rather D		Neutral		Rather E		Very E		TOTAL	
	F	M	F	M	F	M	F	M	F	M	F	M	F	M
Get New Email														
gender answers	0	0	0	0	1	4	8	9	39	31	23	10	71	54
total answers		0		0		5		17		70		33		125
each gender %	0	0	0	0	1.4	7.4	11	17	55	57	32	19	100	100
gender %	0	0	0	0	0.8	3.2	6.4	7.2	31	25	18	8	57	43
total %		0		0		4		14		56		26		100
Write Email														
gender answers	0	0	0	0	0	2	1	2	11	12	59	38	71	54
total answers		0		0		2		3		23		97		125
each gender %	0	0	0	0	0	3.7	1.4	3.7	15	22	83	70	100	100
gender %	0	0	0	0	0	1.6	0.8	1.6	8.8	9.6	47	30	57	43
total %		0		0		1.6		2.4		18		78		100
Reply Email														
gender answers	1	0	1	2	23	13	21	18	18	16	7	5	71	54
total answers		1		3		36		39		34		12		125
each gender %	1.4	0	1.4	3.7	32	24	30	33	25	30	9.9	9.3	100	100
gender %	0.8	0	0.8	1.6	18	10	17	14	14	13	5.6	4	57	43
total %		0.8		2.4		29		31		27		9.6		100
Forward Email														
gender answers	1	0	2	3	15	12	20	17	21	13	12	9	71	54
total answers		1		5		27		37		34		21		125
each gender %	1.4	0	2.8	5.6	21	22	28	31	30	24	17	17	100	100
gender %	0.8	0	1.6	2.4	12	9.6	16	14	17	10	9.6	7.2	57	43
total %		0.8		4		22		30		27		17		100
Open Address Book														
gender answers	0	0	0	1	3	3	6	8	32	20	30	22	71	54
total answers		0		1		6		14		52		52		125
each gender %	0	0	0	1.9	4.2	5.6	8.5	15	45	37	42	41	100	100
gender %	0	0	0	0.8	2.4	2.4	4.8	6.4	26	16	24	18	57	43
total %		0		0.8		4.8		11		42		42		100

Evaluation of Webmail symbols : Question 2 (symbols 6 – 10)

QUESTION # 2.-

How do you think it will be for the users to remember the relationship between meaning and symbol?

Difficult - Easy To Understand	None		Very D		Rather D		Neutral		Rather E		Very E		TOTAL	
	F	M	F	M	F	M	F	M	F	M	F	M	F	M
Organize Folders														
gender answers	0	0	1	1	8	8	13	13	24	19	25	13	71	54
total answers		0		2		16		26		43		38		125
each gender %	0	0	1.4	1.9	11	15	18	24	34	35	35	24	100	100
gender %	0	0	0.8	0.8	6.4	6.4	10	10	19	15	20	10	57	43
total %		0		1.6		13		21		34		30		100
Save Email														
gender answers	0	0	3	8	22	17	28	13	13	15	5	1	71	54
total answers		0		11		39		41		28		6		125
each gender %	0	0	4.2	15	31	31	39	24	18	28	7	1.9	100	100
gender %	0	0	2.4	6.4	18	14	22	10	10	12	4	0.8	57	43
total %		0		8.8		31		33		22		4.8		100
Delete Email														
gender answers	0	0	1	1	6	8	4	13	24	10	36	22	71	54
total answers		0		2		14		17		34		58		125
each gender %	0	0	1.4	1.9	8.5	15	5.6	24	34	19	51	41	100	100
gender %	0	0	0.8	0.8	4.8	6.4	3.2	10	19	8	29	18	57	43
total %		0		1.6		11		14		27		46		100
Connect to Account														
gender answers	0	0	2	6	16	13	17	13	23	16	13	6	71	54
total answers		0		8		29		30		39		19		125
each gender %	0	0	2.8	11	23	24	24	24	32	30	18	11	100	100
gender %	0	0	1.6	4.8	13	10	14	10	18	13	10	4.8	57	43
total %		0		6.4		23		24		31		15		100
Disconnct from Account														
gender answers	0	0	1	7	15	11	19	17	21	12	15	7	71	54
total answers		0		8		26		36		33		22		125
each gender %	0	0	1.4	13	21	20	27	31	30	22	21	13	100	100
gender %	0	0	0.8	5.6	12	8.8	15	14	17	9.6	12	5.6	57	43
total %		0		6.4		21		29		26		18		100

Evaluation of Webmail symbols : Question 3 (symbols 1 – 5)

QUESTION # 3.-

How do you think users will find the aesthetics of the symbol?

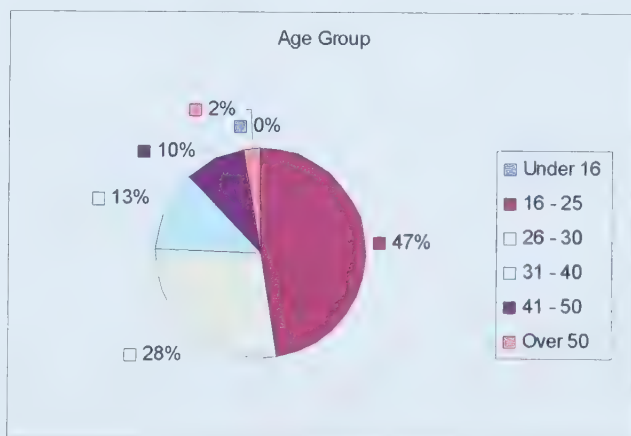
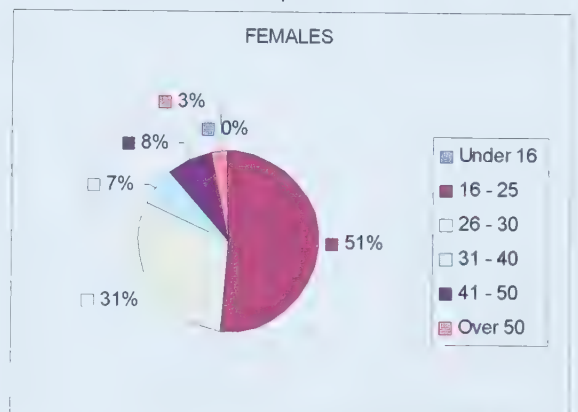
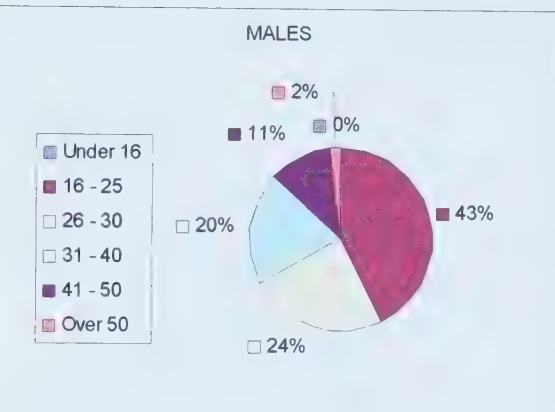
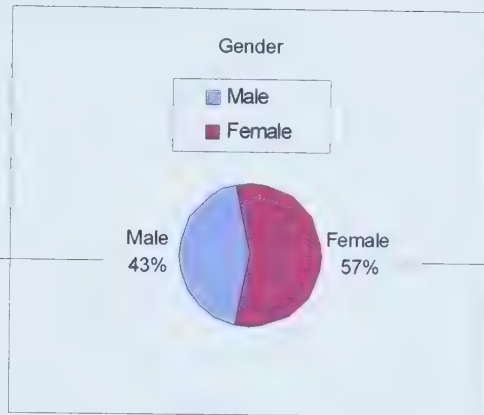
Difficult - Easy To Understand	None		Very D		Rather D		Neutral		Rather E		Very E		TOTAL	
	F	M	F	M	F	M	F	M	F	M	F	M	F	M
Get New Email														
gender answers	0	0	0	1	2	4	21	26	36	19	12	4	71	54
total answers		0		1		6		47		55		16		125
each gender %	0	0	0	1.9	2.8	7.4	30	48	51	35	17	7.4	100	100
gender %	0	0	0	0.8	1.6	3.2	17	21	29	15	9.6	3.2	57	43
total %		0		0.8		4.8		38		44		13		100
Write Email														
gender answers	1	0	0	0	0	3	16	14	29	23	25	14	71	54
total answers		1		0		3		30		52		39		125
each gender %	1.4	0	0	0	0	5.6	23	26	41	43	35	26	100	100
gender %	0.8	0	0	0	0	2.4	13	11	23	18	20	11	57	43
total %		0.8		0		2.4		24		42		31		100
Reply Email														
gender answers	1	0	1	3	10	10	34	29	18	10	7	2	71	54
total answers		1		4		20		63		28		9		125
each gender %	1.4	0	1.4	5.6	14	19	48	54	25	19	9.9	3.7	100	100
gender %	0.8	0	0.8	2.4	8	8	27	23	14	8	5.6	1.6	57	43
total %		0.8		3.2		16		50		22		7.2		100
Forward Email														
gender answers	0	1	1	1	8	11	37	31	18	7	7	3	71	54
total answers		1		2		19		68		25		10		125
each gender %	0	1.9	1.4	1.9	11	20	52	57	25	13	9.9	5.6	100	100
gender %	0	0.8	0.8	0.8	6.4	8.8	30	25	14	5.6	5.6	2.4	57	43
total %		0.8		1.6		15		54		20		8		100
Open Address Book														
gender answers	0	0	1	1	2	1	15	23	31	22	22	7	71	54
total answers		0		2		3		38		53		29		125
each gender %	0	0	1.4	1.9	2.8	1.9	21	43	44	41	31	13	100	100
gender %	0	0	0.8	0.8	1.6	0.8	12	18	25	18	18	5.6	57	43
total %		0		1.6		2.4		30		42		23		100

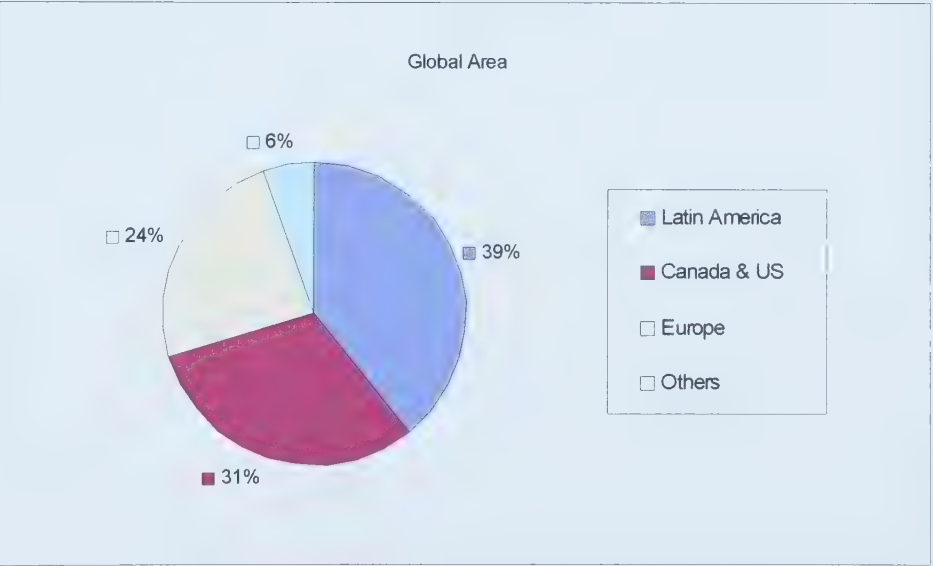
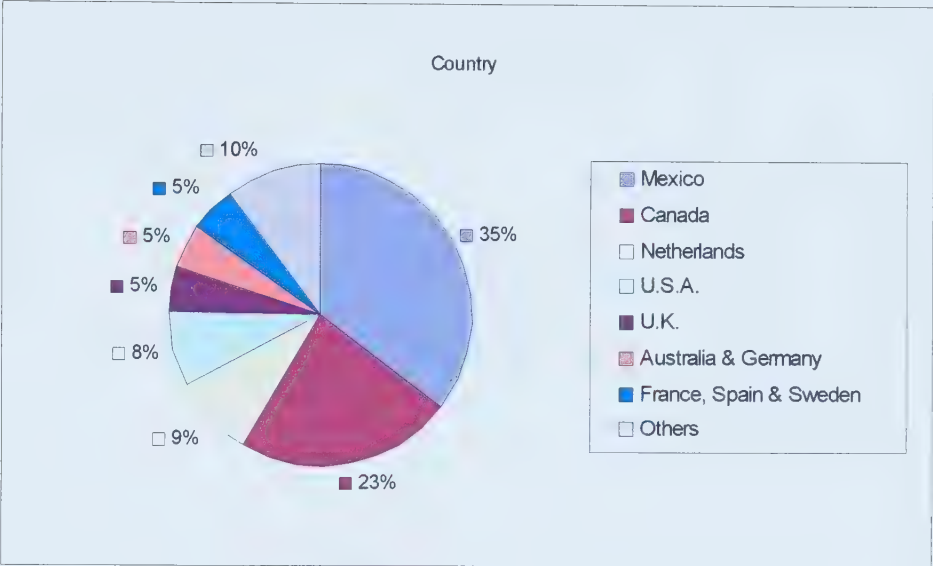
Evaluation of Webmail symbols : Question 3 (symbols 6 – 10)

QUESTION # 3.-

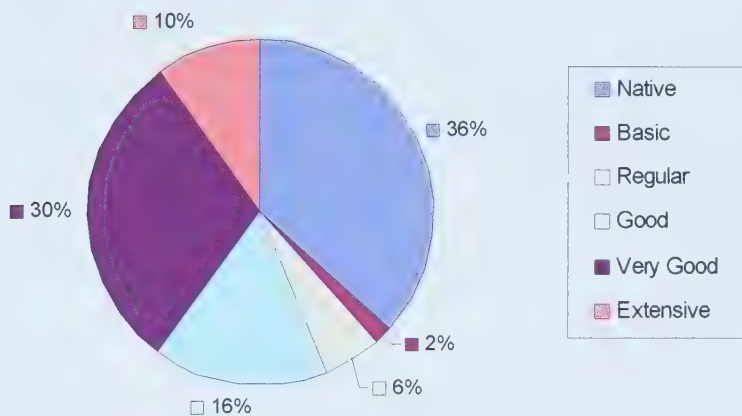
How do you think users will find the aesthetics of the symbol ?

Difficult - Easy To Understand	None		Very D		Rather D		Neutral		Rather E		Very E		TOTAL	
	F	M	F	M	F	M	F	M	F	M	F	M	F	M
Organize Folders														
gender answers	0	0	2	0	4	5	33	29	20	14	12	6	71	54
total answers	0		2		9		62		34		18		125	
each gender %	0	0	2.8	0	5.6	9.3	46	54	28	26	17	11	100	100
gender %	0	0	1.6	0	3.2	4	26	23	16	11	9.6	4.8	57	43
total %	0		1.6		7.2		50		27		14		100	
Save Email														
gender answers	0	0	4	6	7	11	35	30	21	6	4	1	71	54
total answers	0		10		18		65		27		5		125	
each gender %	0	0	5.6	11	9.9	20	49	56	30	11	5.6	1.9	100	100
gender %	0	0	3.2	4.8	5.6	8.8	28	24	17	4.8	3.2	0.8	57	43
total %	0		8		14		52		22		4		100	
Delete Email														
gender answers	0	0	1	1	8	11	26	21	21	12	15	9	71	54
total answers	0		2		19		47		33		24		125	
each gender %	0	0	1.4	1.9	11	20	37	39	30	22	21	17	100	100
gender %	0	0	0.8	0.8	6.4	8.8	21	17	17	9.6	12	7.2	57	43
total %	0		1.6		15		38		26		19		100	
Connect to Account														
gender answers	1	0	1	5	6	10	26	15	24	15	13	9	71	54
total answers	1		6		16		41		39		22		125	
each gender %	1.4	0	1.4	9.3	8.5	19	37	28	34	28	18	17	100	100
gender %	0.8	0	0.8	4	4.8	8	21	12	19	12	10	7.2	57	43
total %	0.8		4.8		13		33		31		18		100	
Disconnect from Account														
gender answers	1	0	3	4	6	5	27	22	20	17	14	6	71	54
total answers	1		7		11		49		37		20		125	
each gender %	1.4	0	4.2	7.4	8.5	9.3	38	41	28	31	20	11	100	100
gender %	0.8	0	2.4	3.2	4.8	4	22	18	16	14	11	4.8	57	43
total %	0.8		5.6		8.8		39		30		16		100	

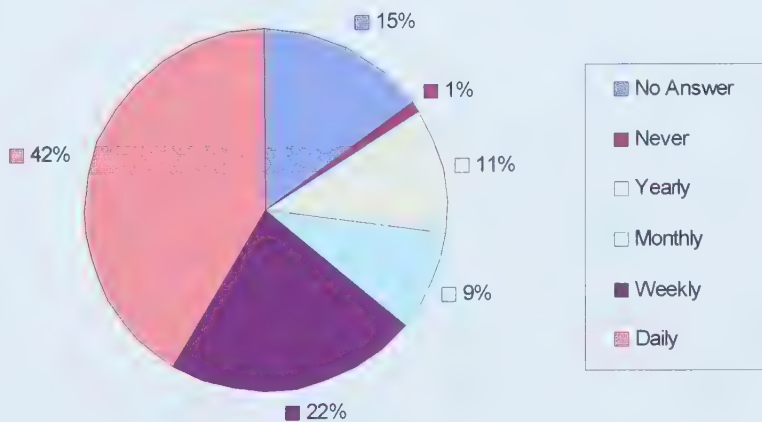




Knowledge of English



Use Webmail



Note:

The scale numbers (1-5) used in the "x" axis of the following bar graphs refer to the answer value of the specific questions they represent, from the Online Survey used for this research.

Refer to the sample of the survey included in the appendix for more details

"None" refers to the number of replies with no answer specified

"Scale 1" refers to the most negative value in the scale of possible answers

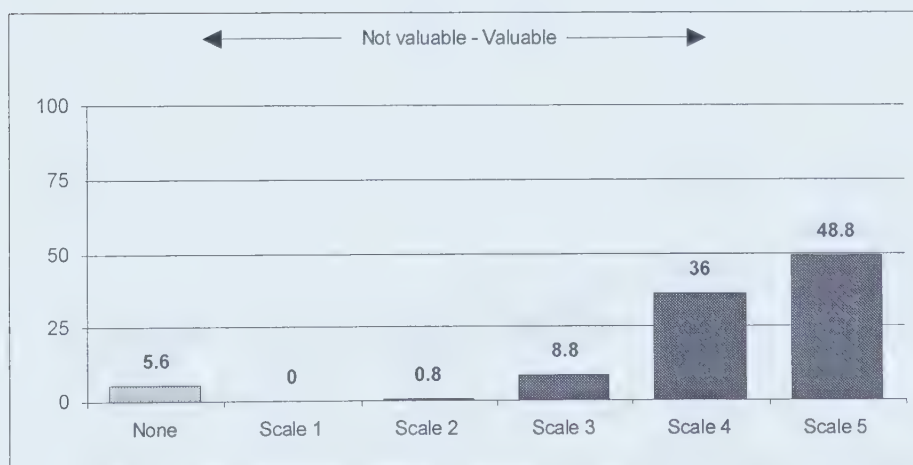
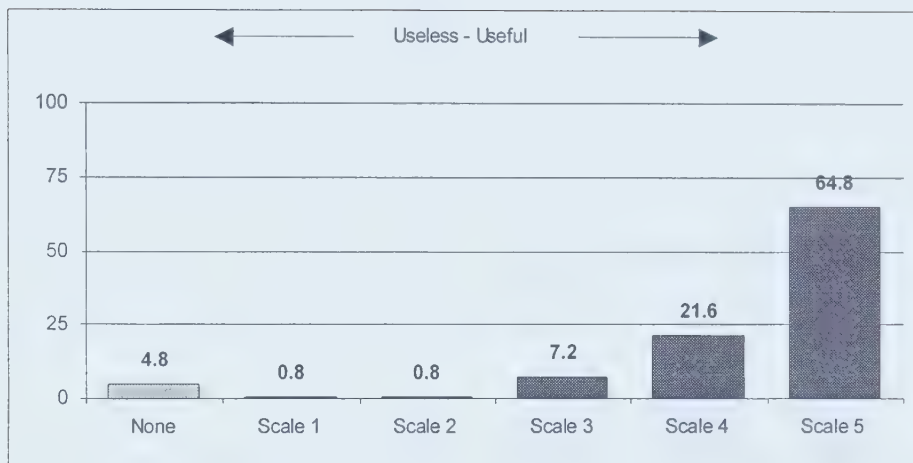
"Scale 2" refers to a negative value in the scale of possible answers

"Scale 3" refers to a neutral value in the scale of possible answers

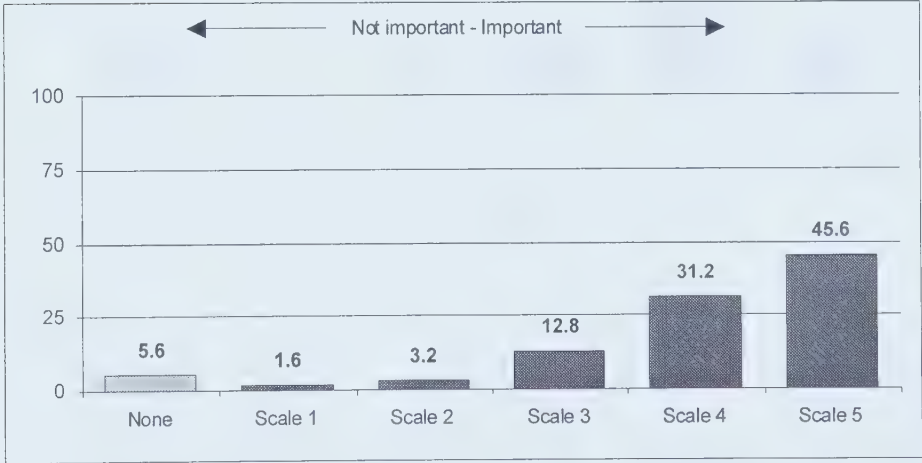
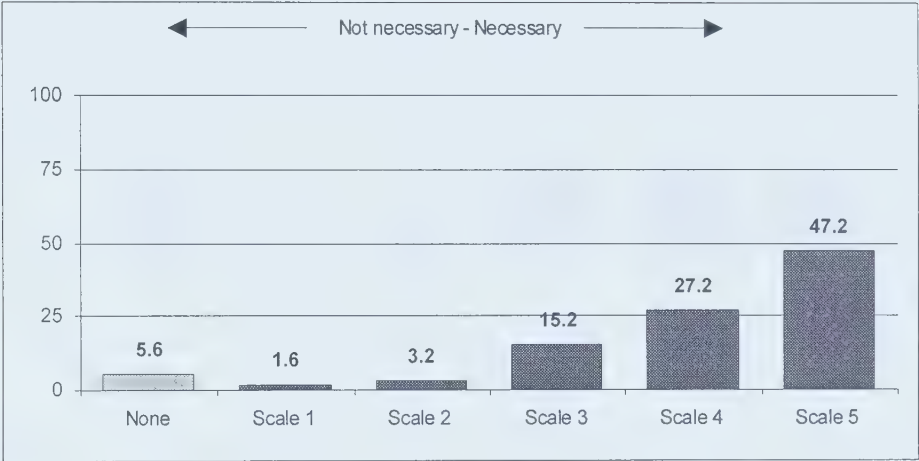
"Scale 4" refers to a positive value in the scale of possible answers

"Scale 5" refers to the most positive value in the scale of possible answers

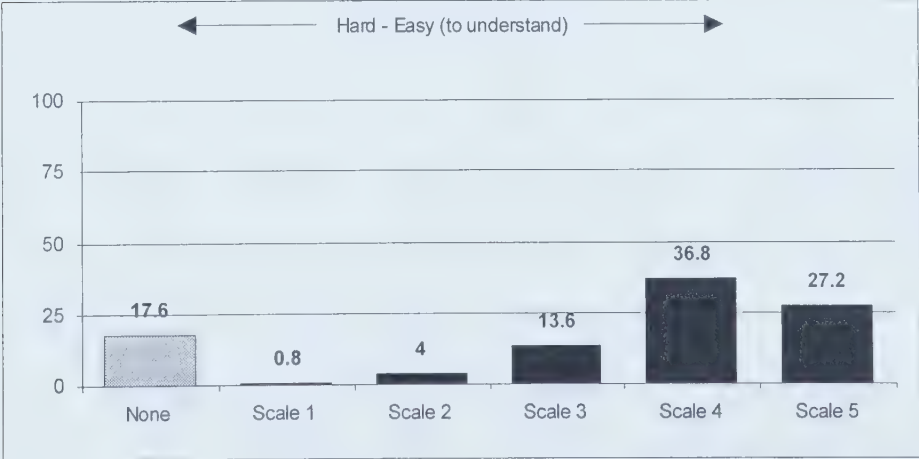
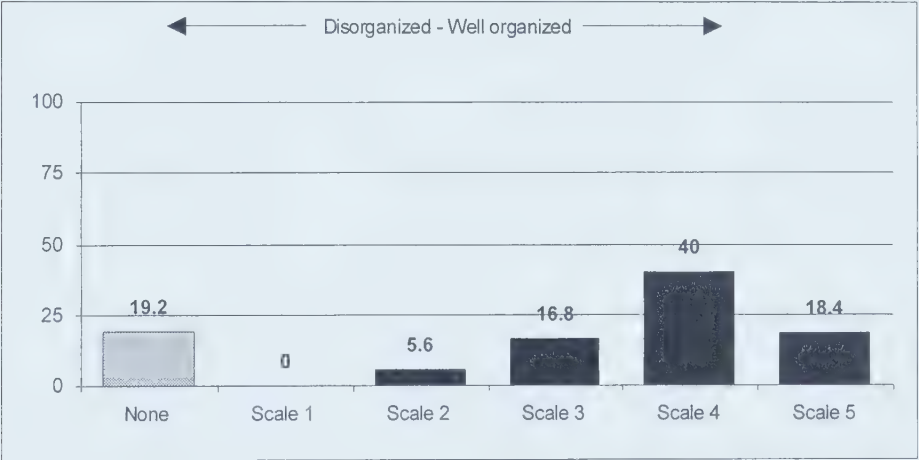
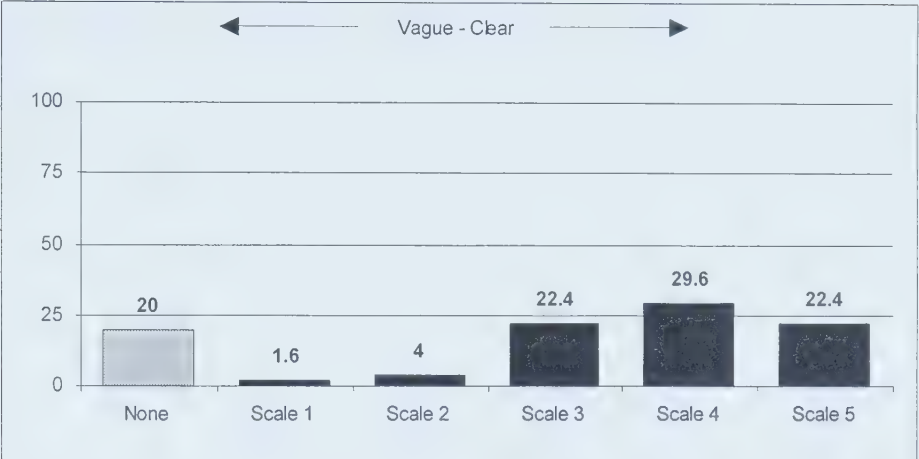
I think free webmail is:



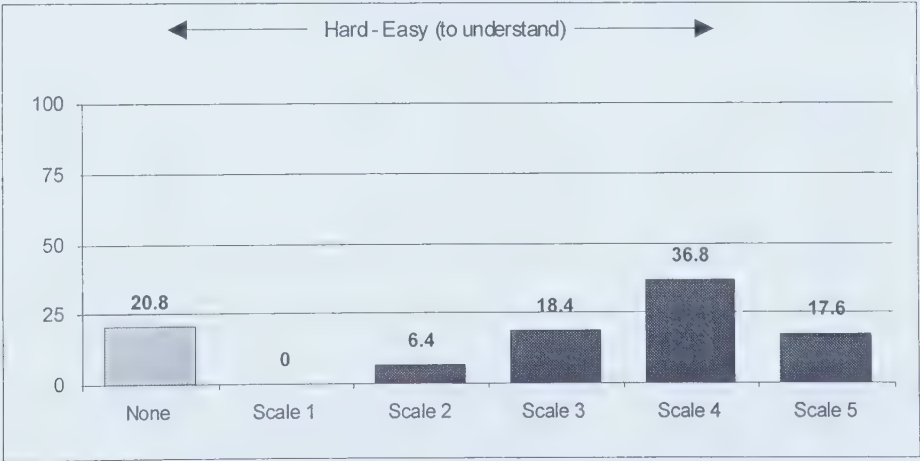
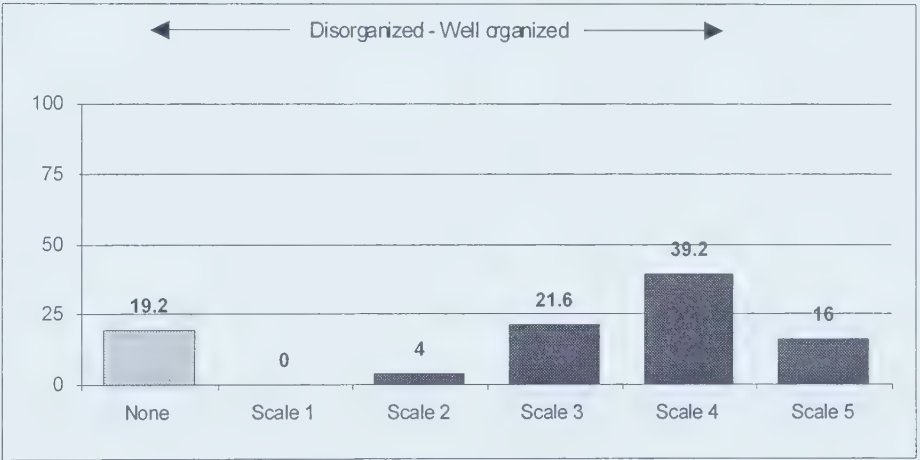
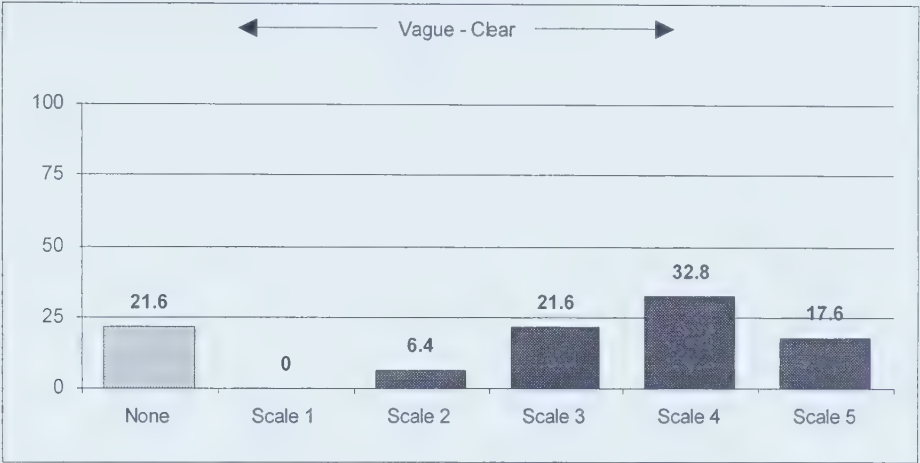
I think free webmail is:



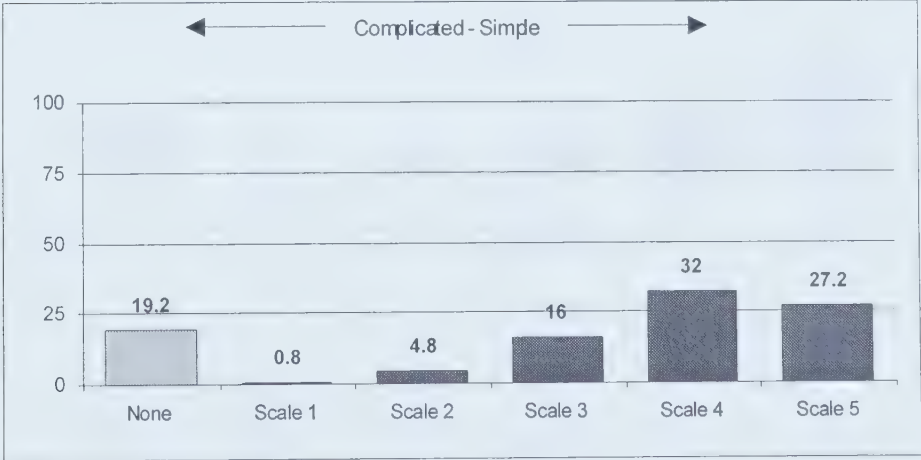
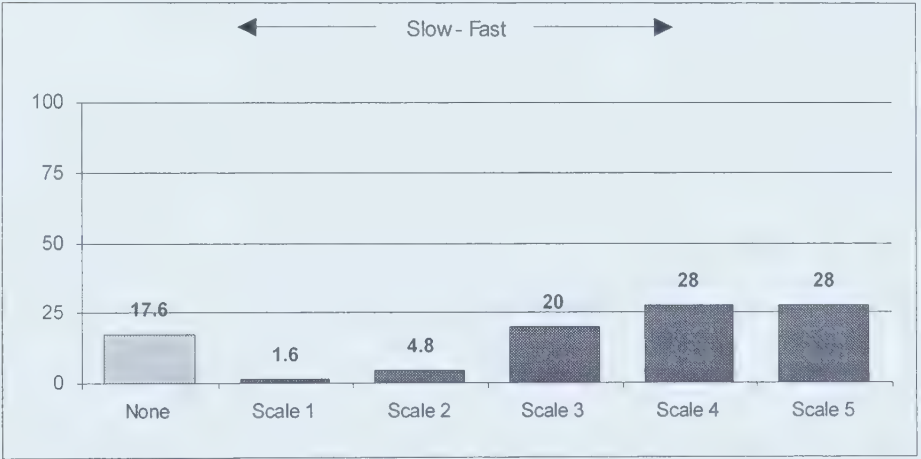
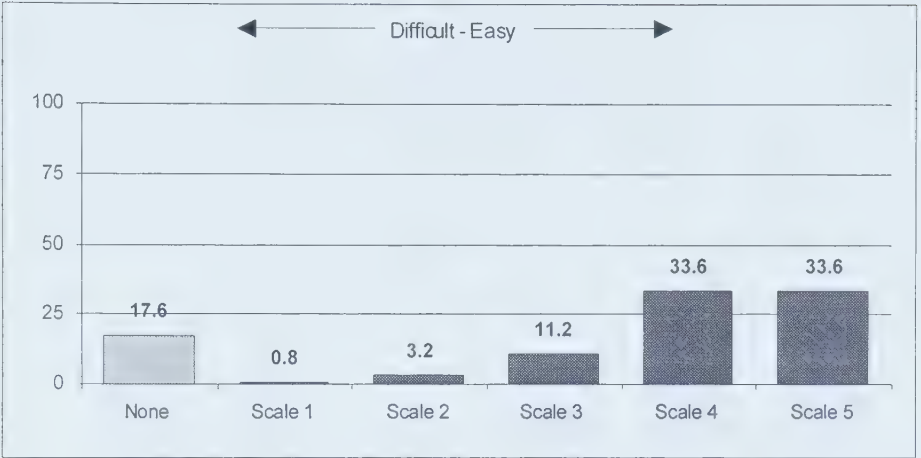
The first times I used it, I considered the structure of my free webmail as:



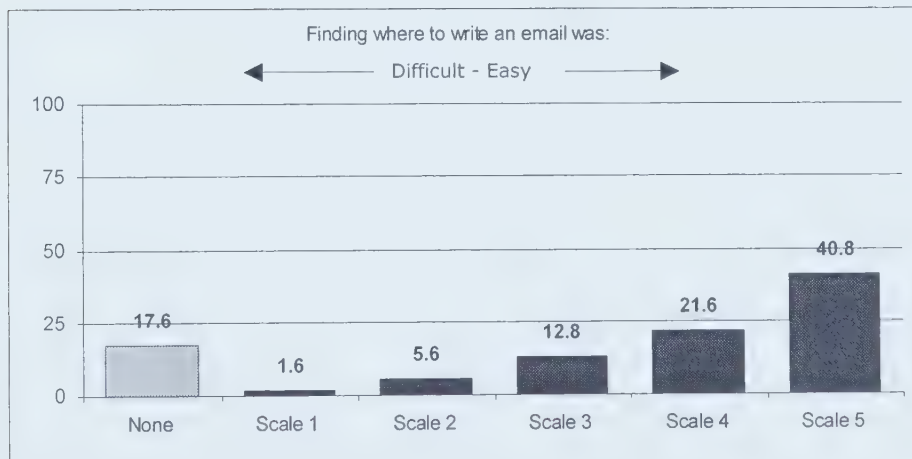
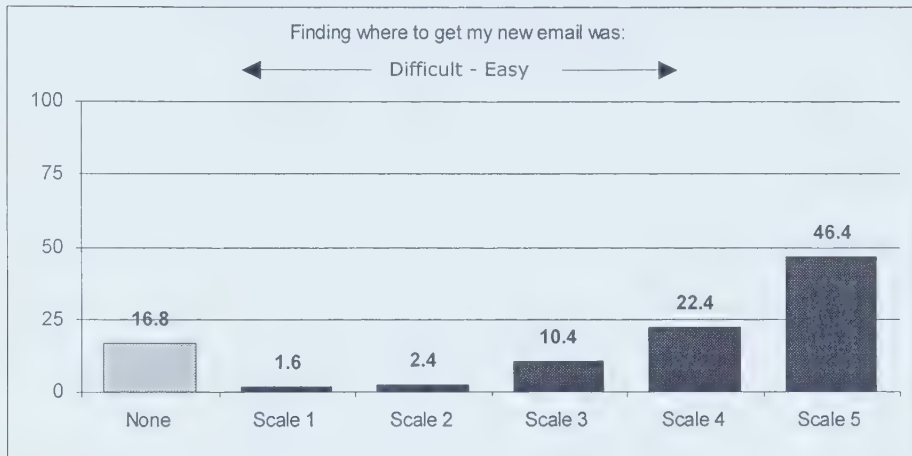
The first times I used it, I considered my free webmail's 'keyword' interface:



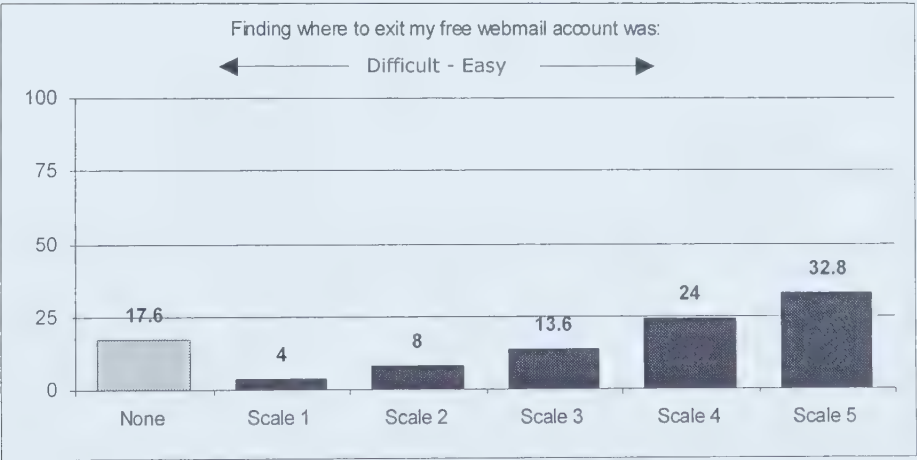
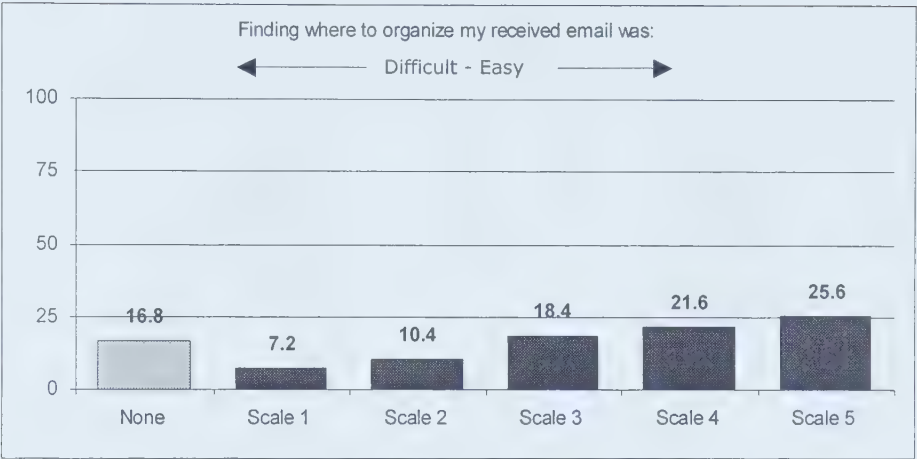
Learning how to use my free webmail service was:



Rating the findability of specific functions of Webmail



Rating the findability of specific functions of Webmail





Connect to Account



Disconnect from Account



Get New Email



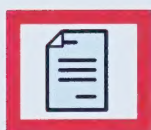
Write New Email



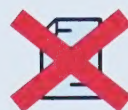
Reply Email



Forward Email



Save Email



Delete Email



Open Address Book



Organize Folders

